The Builder.

No. CCCXXXIX.

*SATURDAY, AUGUST* 4, 1849.

ISEOMAGUS, Caerleon, Cestria, or CHESTER, as we now call it, is known by every one to be full of interest. The Roman and the "Goth" have both left their impress in every quarter, and have concurred to render it a place of delight for the modern antiquary, and the city of all others for "The British Archæological Association" to spend a week in. The Roman altars, hypocausts, and other recovered *vestigia*,—the peculiar arrangement of the streets (the "Rows," as they are termed), the walls, the castle, the numerous stone crypts to be found in various parts of the city, two or three churches, and last in order, but not in importance, the Cathedral,—all claim the attention of the visiter, and gratify the inquirer.

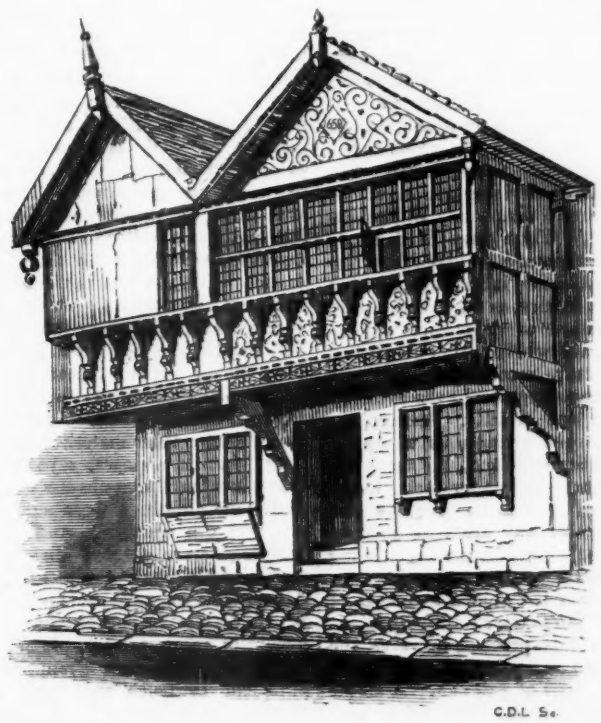
The cathedral externally is in a miserable state of decay, the result of the use of the red sandstone,* and has little of beauty remaining: when the canopied niches, open parapets, and crocketted pinnacles, however, formerly there, were perfect, its appearance must have been exceedingly handsome. It is greatly to be desired that some arrangement for its restoration, its maintenance even, should be speedily made. Internally a considerable sum of money has been spent in repairs, and considerable improvements have been made, especially in the choir, through the exertions of the dean (Dr. Anson), and others. The bishop's throne has been restored, new seating put up, a new stone pulpit and screen erected (mentioned some time since in our pages), some windows filled with stained glass, and other works done. The pulpit has an elaborately carved stone canopy, which is not so satisfactory as the lower part. The details seem to us clumsy, and being supported wholly at the back, corbelling over therefore, the notion of wood rather than of stone is given. It was designed by Mr. Hussey, and was the gift of the present excellent mayor, Sir Edward S. Walker, who, we may here say, has entered most warmly into the views of the Archæologocal Association, and greatly aided in the singular success which has attended the meeting.

A few years ago the choir of the cathedral was vaulted with wood and plaster, made to look like stone, and something is said about pursuing the same course in the nave. We mention this simply that we may advise the authorities to do no such thing. If wood is to be used, let it be *as* wood, and not in the place, and in imitation of another material. The feeling of the chapter appears to be so good, that we feel certain they will receive the remark in the spirit in which it is made.

Mr. Ashpitel, assisted by Mr. C. Bailey, ably illustrated the cathedral on the second evening meeting, and we shall probably give the heads of their paper, so that we will not now make any further remarks on the building beyond mentioning the CHAPTER HOUSE and vestibule, of which we have engraved a view. This, unlike that of Lincoln, illustrated by us some time since, and Salisbury (of which we intend to speak on another occasion) is a parallelogram, and a very interesting specimen of Early English. It is called 50 feet in length, 26 feet wide, and 55 feet high, so that it is nearly a double cube. The heads of the lights, it will be observed, take a peculiar shape, in following the line of the groining. The sides of the apartment at this moment are encumbered by ugly bookcases, but these we have omitted in the view, and hope soon to hear that they have been removed from the building.

* The earliest portions, belonging to the twelfth century, are in a comparatively sound state.

The streets of Chester have been much modernized within a few years; they are still, however, full of quaint old fronts, mostly overhanging and belonging in date to the end of the sixteenth and commencement of the seventeenth century. One in Watergate-street is inscribed 1539; another, dated 1652, has this motto, "God's providence is my inheritance;" put up, it is said, by the occupier after escaping the plague. Some of the houses are very elaborately carved. We give a hasty memorandum of one of simpler character.



C.D.L. Sc.

Of the churches and some of the works at present being executed we shall have another opportunity to speak. We must now relate succinctly some of the proceedings of the meeting, intending, however, as our custom has been, to refer chiefly to those matters which more immediately interest our readers.

It has been the most successful congress yet held by the association, nearly 400 tickets having been disposed of. From the Bishop, whose courtesy and ability have made friends of all, down to the humblest shopkeeper, all have appeared anxious to aid in rendering the visit an agreeable one. What the Bishop said at the opening meeting, when introducing the president, Lord Albert Conyngham, was made true—"As I am sure there will be nothing wanting on the part of the members of the Association to make their visit instructive to themselves, so I am sure there will be nothing wanting on our part to mark our sense of the privilege that has been conferred on us, and to make your visit, my Lord, so far as we can, agreeable to yourselves, and not altogether unworthy of the distinguished honour which it implies."

The President said in the course of his address,—"Though the science of Archæology may be followed as a relaxation to the mind, it is highly important in the graver pursuits of life. No person taking part in public life can do so without some antiquarian knowledge. The explanation of the technical forms of government, the principles of public policy, the tenures of land, our British union of Teutonic custom with the Roman law, cannot be understood without some antiquarian research. That eminent and often quoted writer, Mons. de Tocqueville, thus lends his authority to the importance of antiquarian research:—If we were able to go back to the elements of states, and to examine the oldest monuments of their history, I doubt not that we should discover the primary cause of the prejudices, the habits, the ruling passions, and in short of all that constitutes what is called the national character. We should then find the explanation of certain customs which now seem at variance with prevailing manners—of such laws as conflict with established principles, and of such incoherent opinions as are here and there to be met with in society; like those fragments of broken chains which we sometimes see hanging from the vaults of an edifice, and supporting nothing. This might explain the destinies of certain nations which seem borne along by unknown force, to ends of which they themselves are ignorant. We cannot investigate and illustrate the monuments and arts of our own country without studying those of the more classic regions. That the artist requires their study we have the authority of Sir Joshua Reynolds, who says—'But we must not rest contented even in this general study of the moderns; we must trace back the art to its fountain head—to that source from whence they drew their principal excellences, the monuments of pure antiquity. As the inventions and thoughts of the ancients, whether conveyed to us in statues, bas-reliefs, intaglios, cameos, or coins, are to be sought after and carefully studied, the genius that hovers over these relics may be called the father of modern art.' But if the study of antiquity is requisite for the politician and the artist, how much more is it required by those who turn their minds towards that higher study which reflects upon the Almighty and his ways!"

Mr. Dillon Croker read a short paper in

answer to the question,—"What is the good of Archæology?" wherein he compared it to the telescope as the medium through which far distant things are revealed to our knowledge.

"It is the observation of Madame de Stael, that 'the erudition derived from archæology is far more animated than that we acquire from books: we seem to revive what we unveil, and the past appears to rise from the dust which concealed it. This passion for antiquity is no idle prejudice. We live in an age when self-interest seems the ruling principle of all men. What sympathy—what enthusiasm can ever be its results.' Madame de Stael, in the same work, also truly says, 'Antiquity inspires insatiable curiosity. To penetrate the past, interrogate the human heart through many ages, to seize on a fact, on a word, and on the manners or customs of a nation; in fact, to re-enter the most distant time in order to conceive how the earth looked in its youth, and in what way men supported the life which civilization has since rendered so complicated—this were a continual effort of imagination, whose guesses discover secrets that study and reflection cannot reveal.' Thus does Madame de Stael popularly show how archæology affects history. Without its aid history is but fable, or what is worse than fable, theory, as regards the past. Archæology establishes or contradicts the existence of nations, and whether they flourished or fell. History may record their rise and progress, but archæology must be the evidence whether history be true or false. Archæology cannot take its proper position as a science until its value is acknowledged, its treasures arranged, and its principles understood. In the process of procuring the most precious ore, much worthless matter has often to be carefully sifted and cast away before its sterling worth can be ascertained; so must the rubbish which encumbers the golden treasures of archæology be gradually cleared away by scientific labourers. In this process, however, the great difficulty is to say what is, or what is not, deserving the name of rubbish. A single character or mark upon the merest fragment of a stone, or piece of clay, may be of infinite importance in forming a link wanting decidedly to connect a chain of convincing argument—that link will be supplied by the study of archæology."

Mr. J. R. Planché read a paper that must have cost him much labour and research, on the "Seals of the Earls of Chester," which afford some curious illustrations of the practice of bearing arms. "No tale," said Mr. Planché truly, "has been too idle, no fable too preposterous, for the majority of the writers on this important, but mis-used subject. Had half the ingenuity and industry been exerted to discover the real origin of armorial insignia which has been wasted upon inventing stories to account for them, what service might have been rendered to history—what light thrown upon genealogy and biography! How many a document has now disappeared or utterly perished, which was accessible to Upton, Legh, Morgan, Fern, Randal Holmes, and others, who have used them but to mystify and perplex their readers! Is it too late to unravel the skein they have so wantonly tangled, to extract the valuable grains which it is but justice to admit they have preserved to us from the bushel of chaff in which they are so provokingly smothered?"

Mr. W. Beamont, in the course of an account of the remains at Edisbury, a place only seven miles from Chester, yet little known, inquired how it happens that within the precincts of Edisbury we seek in vain for any remains of the castle of the Saxon foundress, Elfleda, or for any decisive traces of the former existence of buildings?

"Walls and structures raised by the Romans in Britain, said he, many centuries before the birth of Edisbury, still remain to attest the grandeur of the builders. The Norman fortress of Halton, and the still greater remains of Beeston, arrest the eye of the traveller at a distance, and astonish him by their grandeur on a near approach. How is it then that within this royal city, raised by the illustrious daughter of our greatest monarch, not one stone remains upon another to show what a Saxon palace might be? Is it that here the hand of the spoiler has been more unrelenting in his devastation, or that the successive waves of ruin have wrecked the last vestiges of Saxon architecture within it? The demolition of Edisbury cannot, I think, be ascribed to any such causes. It is more probably owing to the habits of our Saxon ancestors, and the general character of their architecture, that we are without any remains of buildings either ecclesiastical or civil within the enclosure of Edisbury. The Saxons were mean builders; neither the structure nor the materials of a Saxon house were calculated for long duration, else would our Saxon ancestors, during their long sway in England, have left us more numerous as well as more perfect remains of the buildings they erected for civil or religious purposes. The ecclesiastical structures of undoubted Saxon origin are but few, and a writer in the *Encyclopædia Metropolitana* informs us there were but few castles in England at the time of the Norman conquest, and that a part of the conqueror's success is to be attributed to that circumstance. Mr. Fishbrooke has given a description and a plate of an ancient Saxon house, and of its prototype, a house of their predecessors the Britons, neither of which structures, either by their form or their materials, gave promise of a long life. It appears, says Mr. Henry, from many incidental hints in our ancient historians, that stone buildings were still very rare in the 8th and 9th centuries, and that when such buildings were erected they were objects of much admiration. Some of the buildings of Alfred were magnificent for that age, and of a new and singular construction; but they were generally more remarkable for their number and utility than their grandeur; for there is sufficient evidence that long after his time almost all the houses in England, and by far the greatest part of the monasteries and churches, were very mean buildings, constructed of wood and covered with thatch."

Of Mr. Halliwell's paper on the "Cottage Literature of the Palatine Counties," read by Mr. Pettigrew, we can only give two jokes from the curious tract of "Tom of Chester," supposed to have been printed in the latter part of the 17th century.

Thus,—an old painter, at the repairing of a church in Chester, was writing sentences of Scripture upon the walls. By chance Tom came into the church, and reading them, perceived much of false English. "Old man," said Tom, "why don't you write true English?" "Alas! Sir," quoth he, "they are poore simple people in this parish, and they will not goe to the cost of it." And again,—"A gentleman in Chester had a goodly fair house, new built, but the broken bricks, tiles, sand, limestones, and such rubbish as is commonly the remains of such buildings, lay confusedly in heaps, and scattered here and there. The gentleman demanded of his surveyor wherefore the rubbish was not carried away. The surveyor said that he purposed to hire a hundred carts for the purpose. The gentleman replied that the charge of carts might be saved, for 'a pit might be digged in the ground and bury it.' 'Sir,' said the surveyor, 'I pray you, what shall we do with the earth which we dig out of the said pit?' 'Why, you silly fellow,' said the gentleman, 'canst thou not dig the pit deep enough, and bury altogether?'"

On the second day, Mr. W. H. Black, of the Record Office, gave a very elaborate review of the public records, which lasted two hours and a-half, and yet fatigued none.

On Wednesday the association, after an examination of the cathedral, went to Conway Castle, to hear a paper on it by Mr. Hicklin, and on Thursday they were to visit Liverpool, to examine some buildings in the neighbourhood and read papers.

A very interesting temporary museum has been formed, in what was formerly the refectory adjoining Chester Cathedral, and is now known as the "King's School." There is a well-known Early English pulpit here, of which we shall give a view.

## THE PERSONAL QUESTION AS TO THE TUBULAR BRIDGES.*

THE tubular bridges constitute an idea now not only realised on British ground, but described and accounted for in the folios of a goodly volume, of great interest and importance. To Mr. Fairbairn the engineering and architectural profession are as certainly indebted for the latter benefit, as he conceives they are for the former, all due justice to the originater of the idea notwithstanding.

In the outset of this elaborate volume, which, besides a large mass of correspondence, and a minute detail of numerous experiments, contains upwards of twenty large plates and a multitude of minor woodcuts, the author, after alluding to the peculiar difficulties to be overcome at Conway and Menai, and the necessity for some *new* expedient in engineering, says—

"It was under these circumstances—having to encounter extraordinary difficulties of execution, and being compelled, by the opposition of so powerful a branch of the Government as the Admiralty Board, to abandon the ordinary resources of the engineer—that Mr. Stephenson conceived the original idea of a huge tubular bridge, to be constructed of riveted plates and supported by chains, and of such dimensions as to allow of the passage of locomotive engines and railway trains through the interior of it.

It was with reference to this expedient, after all others had been found inapplicable, that I was consulted by him, and that my opinion was requested, first as to the practicability of the scheme, and secondly as to the means necessary for carrying it out. This consultation took place early in April, 1845, and as far as could be gathered from Mr. Stephenson at the time, his idea then was, that the tube should be either of a circular or an egg-shaped sectional form. He was strongly impressed with the primary importance of the use of chains, placing his reliance in them as the principal support of the bridge; and he never for a moment entertained the idea of making the tube self-supporting. The wrought-iron tube, according to his idea, indeed, was entirely subservient to the chains, and intended to operate from its rigidity and weight as a stiffener, and to prevent, or at least to some extent counteract, the undulations due to the catenary principle of construction. In fact, for many months afterwards, and even up to the time of the experiments on the model tube in December, 1846, he insisted, as will be seen from the annexed correspondence, on the application of such chains. A perusal of this correspondence will, moreover, show that I was throughout strongly opposed to their application, even as an auxiliary. I always felt that in a combination of two bodies, the one of a perfectly rigid, and the other of a flexible nature, there was a principle of weakness; for the vibrations to which the one would be subjected, would call into operation forces whose constant action upon the rivets and fastenings of the other could not but tend to loosen them, and thus, by a slow but sure agency, to break up the bridge.

At the period of the consultation in April, 1845, there were no drawings illustrative of the original idea of the bridge, nor had any calculations been made as to the strength, form, or proportions of the tube. I was asked whether such a design was practicable, and whether I could accomplish it; and it was ultimately arranged that the subject should be investigated experimentally, to determine, not only the value of Mr. Stephenson's original conception, but that of any other tubular form of bridge which might present itself in the prosecution of my researches. The matter was placed unreservedly in my hands; the entire conduct of the investigation was entrusted to me; and, as an experimenter, I was to be left free to exercise my own discretion, in the investigation of whatever forms or conditions of the structure might appear to me best calculated to secure a safe passage across the Straits. This freedom of action was obviously necessary to the success of my experiments."

* An Account of the Construction of the Britannia and Conway Tubular Bridges: with a complete history of their progress, from the conception of the original idea to the conclusion of the elaborate experiments which determined the exact form and mode of construction ultimately adopted. By William Fairbairn, C.E. London: Weale; and Longman and Co. 1849.

At an entertainment, however, given when the first of the Conway tubes was completed, as our readers may be aware, Mr. Robert Stephenson, to whom Mr. Fairbairn attributed the original idea, had himself claimed everything, in short, but 'aid.' This occurred on 17th May, 1848.

"It is now upwards of six, or about seven years," said he on that occasion, "since I entertained the idea of constructing bridges with wrought-iron plates riveted together. I was called upon,—in a smaller case I admit, but not a very simple one,—to construct a bridge authorised by Act of Parliament, but with such limitations that it became a matter of extreme difficulty. All the ordinary kind of bridges were discussed, and I eventually hit upon the notion, and the designs were completed, *for a thin tubular bridge*, although not precisely the same as the present, yet *in principle precisely the same*. That was effectually completed, and answers its purpose, and may be now seen on the Northern and Eastern Railway. From that time, however, to the period of commencing the Chester and Holyhead Railway, the idea fell, or dropped rather, for the time, in consequence of the expense of wrought-iron rather exceeding that of cast. * * * * Parliamentary powers were granted for the construction of a bridge over the Britannia rock, with such conditions attached to it as rendered it all but, if not absolutely, impracticable. It was then, to use a common expression, that I felt myself fairly 'driven into a corner.' No existing species of bridge was at all applicable under the operation of the Act of Parliament as granted; and it was after an anxious investigation of every possible description of bridge, that it occurred to me, that by *reviving the old notion of seven years ago*, that by extending it, it might enable me to get over the difficulty. Approximate calculations were immediately made, and the result of those calculations were such as to satisfy me of the perfect feasibility of the work. I had satisfied myself that the thing was practicable, and I stood by it. I obtained the consent of the directors to institute a very laborious, and elaborate, and expensive series of experiments, in order, most thoroughly, to test experimentally the theory I had formed, and also to add suggestions for its full development. It was then that I called in the aid of two gentlemen, eminent, both of them, in their profession, Mr. Fairbairn and Mr. Hodgkinson. [Here follow a few compliments, of no importance to the point at issue.] But having mentioned these two names, there is another gentleman that I wish to call to your notice—I allude to my assistant, Mr. Edmund Clarke. He has been my closet companion from the commencement of the preliminary investigation; no variation or inconsistency in the experiments eluded his keen perception; he was always on the look out for contingences that might affect the success—though not the principle, still the success—of the undertaking; and he and the other gentlemen whom I have just named, are the three to whom I feel deeply indebted for having brought the theory I first broached to such perfection, and I thus publicly tender them my acknowledgments."

Mr. Fairbairn more particularly alludes to this speech in his concluding remarks. Our quotation of these, however, like that of the preceding, must be a condensed and brief one.

"The inaccuracies, both as to facts and dates, in this statement of Mr. Stephenson," he observes, "are very numerous. It simply requires a reference to the short description of the Ware-bridge, p. 113, and to the drawings, to disprove the assertion, 'that it is a *thin tubular bridge*, although not precisely the same as the present, *yet in principle precisely the same*;' and it can be easily shown too, that considering the Ware-bridge as a simple girder bridge, it is exceedingly defective in design. Is there any thing new in this application of wrought-iron plate girders? As well might it be said that the combination of wrought-iron deck beams, so many years applied in iron ships for the support of the decks, is 'a counterpart of the proposed cellular top for the Britannia tubes.' I really cannot but regret that Mr. Stephenson, whose name will be always associated with the grandest bridge that has ever been constructed, should have committed himself in making such an erroneous assertion, as that it was by reviving and extending his original conception of this imperfect structure at Ware, that he was led to originate the bridges crossing the Conway and Menai Straits. * *

Let the reader turn again to the earlier letters of the correspondence, and he will find of what a crude and dangerous scheme that idea consisted; how totally dissimilar, in form and principle, it was to the present tubular structures, and how slowly Mr. Stephenson was persuaded to give up his earliest conceptions. Again, it was I, and not Mr. Stephenson, that solicited Mr. Hodgkinson's co-operation, and this was not done until I had been actively engaged for several months in my experimental researches, and after I had discovered the principle of strength which was offered in the cellular top, and not only proved the impracticability of Mr. Stephenson's original conception, but had given the outline of that form of tube which was ultimately carried into execution.

Mr. Bateman, C.E., showed the unjustifiable position which had been taken by Mr. Stephenson, and asserted, that in an engineering work of such novelty and magnitude, Mr. Stephenson would not have injured his own reputation, by acknowledging, in suitable and truthful terms, the merits due to those who had rendered him the most valuable service. Mr. Stephenson replied to his letter, and the tenor of his remarks showed his determination to stand by his public assertion. He quoted, from my letter of the 27th of October, 1846, my testimony to his claim of originality in having the application of *a* wrought-iron tube for the purposes of railway traffic; a great merit which neither Mr. Bateman nor myself had ever denied to him, and which I have uniformly asserted that he is undoubtedly entitled to. But he left entirely untouched the point at issue, viz., that it was almost exclusively my exertions which gave to his conception a useful and practicable form—that the experiments which I had conducted and originated, showed the weakness of the *circular* tube, which he had originally recommended—that I alone showed him the danger of the principle which he was anxious, for so great a length of time, to carry out, by attaching a flexible catenary to a perfectly rigid platform or roadway,—that from the results of these experiments, I designed and submitted for his approval an entirely novel kind of tubular bridge, different in form, different in principle, vastly superior in economy of material and strength, and which was finally approved and carried out, and which is now in existence, spanning the rapid estuary at Conway, and admirably fulfilling the varied requirements of railway traffic with perfect security."

In support of his allegations, Mr. Fairbairn adduces an abundant mass of correspondence and experiments, showing the gradual progression through which the series of trials naturally advanced from the first crude idea towards maturity. From this evidence it first of all appears that the idea—the original idea which he was called upon to test by experiment, or which at least *was* so tested, at Mr. Stephenson's instance,—was nothing cellular at all,—nay, not even modified as yet into *any* sort of scheme for strengthening either top or bottom, but simply a cylindrical tube made of riveted iron plates; and tubes such as these *altogether failed* to support anything like a safe or sufficient weight, uniformly yielding, primarily above to compression in wrinkles, cross corrugations, or puckers, but also readily to tension below, in disjointings and rents. These results were next followed by obvious appliances for the *strengthening, and even the local patching*, of those parts, *above at least*, which so readily gave way. In the midst of these we find Mr. Fairbairn's first suggestion of a form of tube not cylindrical and self-supporting, but intended, as he says, to meet Mr. Stephenson's views, though, as he thought, superior to one supported by chains, the necessity for which the latter appears to have urged even after he had been convinced by Mr. Fairbairn that the tube *would* be entirely self-supporting, as he still did not think it could be *put up* without the aid of that costly adjunct.*

The suggestion just referred to was made in a letter to Mr. Stephenson, dated 31st May, 1845, and enclosing a sketch of such a tube, strengthened above, but without the most distant idea or semblance of cells, as yet, even on Mr. Fairbairn's part. On the 3rd June following, a very ingenious suggestion is made by the latter for the erection of such a tube without even the temporary aid of the objectionable chains, by working simultaneously from each pier in opposite directions, so as to maintain a sort of equilibrium till the centres met. These and subsequent communications are followed up by a note from Mr. Stephenson, of date 21st July (1845), in which he says, with reference to the tubes, "*I hope* some of them, of an *elliptical* form, and *with thick plates* at the top and bottom, *will be tried*." Still nothing of the *principle*—the cellular—on the part of either. It is fair, indeed, to conclude, from Mr. Stephenson's own words, that as yet that principle had never even been dreamed of either by one or other of them.

"The difficulties," here remarks Mr. Fairbairn, "experienced in retaining *the cylindrical* tubes in shape, when submitted to severe strains, naturally suggested the rectangular form. Many new models of this kind were prepared and experimented on before the end of July, and others, with different thicknesses of top and bottom plates, or flanches, before 6th August." Of that date a letter, containing the following passage, was written by Mr. Fairbairn to Mr. Stephenson:—

"In almost every instance we have found the resistance opposed to compression the weakest; the upper side generally giving way from the severity of the strain in that direction. These facts are important so far as they have given rise to a new series of experiments, calculated to stiffen or render more rigid the upper part of the tube, as well as to equalise the strain, which in our present construction is evidently too great for the resisting forces of compression."

And now comes the germ of the cellular principle. "It occurred to me," says Mr. Fairbairn, "that the top might be strengthened by other means than by *thickening* it, and I addressed the following letter to my son, four days after the date of the last." In this he directs him to have prepared *a rectangular tube with a hollow triangular 'fin' or corrugation* (or cell, in fact) of sheet-iron, running along the top, to which it was to be riveted. The idea of a single long corrugation, to counteract the cross corrugation of the puckerings of compression, forthwith led him to that of two such corrugations doubled and reversed, so as to appear *in section* like a pair of spectacles; the superior strength of which, Mr. Fairbairn remarks, induced him "to adopt that cellular structure of the top of the tube which ultimately merged in a single row of rectangular cells—that structure which gives to the bridges now standing across the Conway straits their principal element of strength."

The next letter is one from Mr. Eaton Hodgkinson to Mr. Fairbairn, of date 18th of same month, written from the "British Iron Works, Abersychan, near Pont-y-pool," intimating that he was now at liberty to offer his services as desired by Mr. Fairbairn, who now found that "the experiments had assumed a shape which seemed to require the assistance of a mathematician, who should deduce, if that were possible, a formula which, from the observed strength of a tube of a lesser, might enable me to calculate the strength of one of a greater size." Mr. Hodgkinson accordingly first appears on the field of operations at Millwall on 19th September, the day when "the tubes which had been constructed with single hollow or cellular tops were experimented on."

While intimating the result to Mr. Stephenson, in a letter dated 20th September, Mr. Fairbairn says,—"You will be aware, on referring to my last letter, that the great difficulty we had to encounter was a due proportion of the parts, so as to neutralize or render the two resisting forces of compression and extension equal;" and, after reviewing the whole series of previous experiments, and pointing out the defects in cylindrical and elliptical tubes, even though protected by single 'fins' or corrugations, he goes on to say—

"It is more than probable that the bridge, in its full size, may take something of the following sectional shape. The parts, *a*, *a*, being two longitudinal plates, divided by vertical plates so as to form squares, calculated to resist the crushing strain in the first instance, and the lower parts, *b*, *b*, also longitudinal plates, well-connected with rivetted joints, and of considerable thickness to resist the tensible strain in the second."

In short, by a natural process somewhat the reverse of that whereby, according to the French anatomists, a 'cell' becomes a 'fin' as well as any other organ, Mr. Fairbairn's 'fin' had now, *and only now* it appears, assumed that very 'cellular' and rectangular form which he afterwards realized at the Conway Strait.

"It is from this period," he remarks, in allusion to these and other experiments immediately following on these, "that I date the disappearance of almost every difficulty respecting the construction and ultimate formation of the Britannia and Conway tubes."

When these experiments — but a faint glimpse of the numerous series of which only we have here had space to offer—were sufficiently matured, the importance of Mr. Fairbairn's *position* appears to have been such as to induce the directors of the Chester and

* Mr. Fairbairn estimated the expense of such a chain at about 200,000*l.*!

Holyhead line, on 13th May, 1846, formally to appoint him joint engineer with Mr. Stephenson for the bridges, and, as to these, on principles of perfect equality with him. The working plans even went forth with Mr. Fairbairn's name alone attached to them; he was authorised to engage the workmen, and he was fully recognised as the acting engineer: indeed, Mr. Stephenson himself, on one occasion, says, "I consider *you as acting with me in every department* of the proceedings."

So much, then, for the assistance which Mr. Fairbairn afforded in the realization of Mr. Stephenson's theory and principle. The original idea, as already said, Mr. Fairbairn freely accords to him.*

## SALISBURY CATHEDRAL AND ITS SCULPTURES.

### THE ARCHÆOLOGICAL INSTITUTE.

In our last number we gave a brief notice of the Archæological Institute's proceedings at Salisbury, wherein we purposely omitted mention of the gloom that was unfortunately thrown over them by the prevalence of cholera in the town, which led the Bishop to decline receiving the Institute, and made the entertainment given by the corporation a silent meeting.

Of some of the places visited we may speak hereafter. On the present occasion we must confine ourselves chiefly to the papers on the cathedral and its sculptures.†

At the opening meeting the Hon. Sidney Herbert, the president, made an excellent address. In the course of it, when speaking of Wiltshire, he said,—In this county, at Malmesbury, lived Hobbes, the philosopher; at Salisbury lived Harris, the author of "Hermes;" in this county resided the late Lord Arundel of Wardour, and near him his acquaintance the late Sir Richard Colt Hoare, who has done so much for the topography of the county. Lord Clarendon took his title from a town in this county; and not far from Old Sarum stands or stood an old manor-house in which Chatham lived when a youth. From that house went forth a young man as a cornet of dragoons, whose voice afterwards thundered through Europe—that man was Lord Chatham. It was impossible to look at that humble village without feeling some emotions in contemplating the spot whence that great man had gone forth, and whose gigantic intellectual proportions are shrouded only by the figure of his still more illustrious son. But Wiltshire had given birth also to poets. He had already spoken of Massinger as having seen the light at Wilton. At Bemerton lived the good George Herbert. And here he would remark what an interesting scene must that have been between him and Laud, when he tried to remove his scruples respecting the cure of souls. No man (said the speaker) was prepared to grapple with the future who had not studied and investigated the past. They had a right to claim in this district examples of wisdom, learning, ability, and poetry: and there was no walk of life in which inspiration could not be drawn from the contemplation of the worth and merits of departed genius.

The Bishop of Oxford who followed, said, It was true that there was an aspect in which antiquarian pursuits may be viewed, as a collection only of the dust as it were of the past, as if virtue and goodness had had no existence. With such a spirit he felt sure that the members had no sympathy. This was the abuse, and not the use of antiquarian pursuits. He knew that there were pursuits connected with antiquarian investigation which may not be abused, and which lifted up the mind and heart to the reverence of the only living and true God. The past may be studied, as if it was better than the present; and we may do nothing but lament the past; but the wise man will learn lessons from it to guide him in the future, and will thank God for the rich inheritance which has been handed down to him from his forefathers; while at the same time he will not overvalue the present, but will find in more senses than one, when he looks back into the history of past ages, that there were indeed "giants in those days." One of the chief merits of a cultivated mind and taste was that of drawing the materials of present enjoyment out of the past and future. This is not mere fancy; not mere imagination. It was taking a practical view of the question; for it was wholly impossible for a man to understand even things around him without investigating those times that had gone before him—without viewing the past in the present. And in the course of such investigations he will stay the hand of sweeping innovation, inasmuch as he will see a use and a meaning which he could not otherwise have discovered, and he will observe how necessary many things that he could not before understand are to the constitution and fabric of society.

The illustration of

### THE CATHEDRAL

was, as usual, entrusted to Professor Willis. He said, that in the other cathedrals which he had explained he had been enabled to trace how each building had grown up by degrees—as at York, Lincoln, Winchester, and Ely—but at Salisbury no cathedral existed previously to the present. This cathedral was erected during the early English period in its best character, containing all traces of the purest style of that era. It was on this account that it was valuable to the student, as affording an independent and unfettered example of the style without mixture. He had never seen such perfect unity of design, even to the mouldings, as was exhibited in this cathedral. The original design was so well preserved that it was almost next to impossible to find out what part was erected first. The tower and spire, and all above the roofs, contain the style in a higher state of development, being erected at a later period than the body of the church, while the cloisters also are later. He would refer to the history of the building. The first Bishop of Sarum—the see being removed from Wilton to Old Sarum—was Herman, who was succeeded by Osmond, who built his cathedral in 1093, in the midst of the fortress. This situation was a great inconvenience to the bishop; and there was also a great want of water for the inhabitants of the city, so that in fact as much money was paid for water as for wine. All these circumstances are set forth in the Bull of Pope Honorius the Third, which was granted March 29, 1218, by which permission was given to remove the see. In 1219 it was agreed to remove from Old Sarum, and a wooden chapel was erected for the performance of the service, instead of remaining in the old church. In 1220 the foundations of the cathedral were laid, and in 1225 the services of the church were performed within it. And there was one curious peculiarity in this ceremony, not seen elsewhere, viz., the great number of stones which were laid, one for the Pope, one for the Archbishop, one for the Bishop himself, one for Longespee, and another for his wife; and some time afterwards others laid stones also. He never recollected a parallel case in the history of the foundation of any church. From 1223 to 1246 Bishop Bingham carried on the works with great activity, and completed them—including the body of the structure and the west front, without the tower and spire, which were afterwards added. In 1258 the cathedral was dedicated—during the episcopate of Bishop Bridport. The cloister and chapter-house were erected during the latter part of the thirteenth century; and by examining the monument of Bishop Bridport, who was buried in 1262, it will be seen that it is of the same date in point of architectural characteristics as the style of the cloisters and chapter-house. It appears that the tower and spire were not contemplated by the original architect, and no provisions had been made for their erection; neither is there any distinct historical record of the time of their construction. But in the chapter records exists a contract by that body with an architect named Richard Farleigh, that he should carry on the work. Thus the name of the architect who erected the tower and spire is known to us. But great as he might have been as an architect, his skill was but small as an engineer, as he ran the risk of crushing down the structure, by the erection of so mighty a tower,—the piers and arches of which never were intended to carry a stone spire. No sooner was the erection of the tower and spire completed than the chapter were in great dismay, and endeavoured to get funds for strengthening the building. In the year 1415 arrangements were made for continuing the repairs of the fabric; for an indenture was made in that year between the chapter and Nicholas Wayte, mason, who constructed the braces, buttresses, and arches, which prevented the tower and spire from falling. This was the last great event of any kind, until the building of the Hungerford and Beauchamp Chapels, which have been removed. In consequence of the havoc which had occurred to the church, we find that after the Restoration Sir Christopher Wren was called on to examine the building, and to fit up the choir and chancel, and to this examination we owe one of the most curious reports ever penned. He mingles in his reports mistakes respecting the style of architecture, while he comments freely on the structure in a mechanical point of view. He admires it exceedingly; but is, however, full of prejudice against what he considers to be the corrupted style of the edifice. The next event was the alteration of the church, under Bishops Hume and Barrington, when the building suffered from an experiment of Wyatt,—it being left to his own judgment as to the manner in which the repairs should be carried out. He did not look at this building with reference to the system upon which it was erected; for it must be borne in mind that this and similar ones must be viewed not so much as mere works of art, but as monumental remains of a peculiar state of architectural science. (Hear, hear.) Neither Wyatt nor his employers acted upon this view of the subject. The changes which Wyatt made in the cathedral were totally irrespective of the uses to which the various portions of the church had been applied. Thus the church was full of screens, arranged and adapted according to the ceremonies of the ancient ritual. It also contained monuments of the pious founders of the church and other eminent persons, and the site on which they stood was in every way connected with the life and purpose of the persons who were buried beneath them. These memorials of primitive times Wyatt removed—no feeling of historical association having entered his head—and he placed them in a row under the pillars of the nave! He also pulled down the Hungerford and Beauchamp Chapels, which were erected in the Perpendi-

* It appears, however, that Mr. Stephenson, even as the originater of the idea of a wrought-iron railway tunnel, is not to be left in quiet possession of his laurels. We do not mean to enter into any controversy on either of these questions, but simply to state that Mr. De la Haye, of Liverpool, whose claims we long ago announced, has sent us a long communication, in which he reminds us of this, and retraces the principal facts and circumstances, which are simply these:—In September, 1844, Mr. De la Haye placed a pamphlet,—published by him five months before at Jersey, and titled, "A Plan for passing Rivers and Channels by means of Wrought-iron Tunnels,"—in the hands of Mr. Smith, editor of the *Liverpool Mercury*, who advised him "to see Sir Joshua Walmsley, at his office in Brunswick-street, and ask him to submit it to his friend George Stephenson, the great engineer. He is a practical man and a bold thinker," adds the editor, "and you would most likely be well guided by his advice.—P.S. You may use my name to Sir Joshua." Mr. De la Haye accordingly saw Sir Joshua, who examined the pamphlet, but "thought the scheme, involving such gigantic works, would not be approved by G. S." This circumstance occurred eight months before Mr. Stephenson's first announcement of an intention to form a wrought-iron tunnel-bridge at Menai; so that it seemed clear at all events that his friend Sir Joshua had no cognizance of such an intention on his part at that time. He, nevertheless, undertook to bring Mr. De la Haye's scheme under the notice of Mr. Stephenson on the following day, when he would see him. "Eight months afterwards," Mr. De la Haye remarks, "Mr. Stephenson proposed a wrought-iron railway tunnel for the Menai Straits, and a few weeks after, a paragraph appeared in the *Liverpool Mercury*, in which it was stated that I had proposed iron tunnels for railway purposes long before G. S., and a rather broad hint was given that the idea had been borrowed from my inventions; but in spite of this, and of the remarks which appeared in THE BUILDER, G. S. never attempted to prove that his was a distinct invention. . . . . The iron tunnel which I had proposed," also observes the writer, in allusion to his pamphlet, "was to be constructed in divisions of 400 feet in length, each division being made perfectly rigid, in order to sustain a weight independent of central support, as I supposed that the bed of the water (at Dover straits) might be as uneven as the surface of the sea during a storm." Mr. De la Haye, of course, is quite aware of the distinction between a submarine tunnel and a tunnel-bridge; but he seems to think that all Mr. Stephenson had to do, in handing it over from the originater to the maturer, was to "fish it out of the water." Previous to the publication of his pamphlet, beginning of 1844, Mr. De la Haye believes that "the words wrought-iron railway tunnel had never appeared together in type." A description of his invention was given in *The Artizan* shortly after THE BUILDER had recorded his claim, but although it was therein admitted "that this plan is identical with that proposed by Mr. Stephenson," still it was held that Mr. Stephenson cannot be fairly charged with plagiarism, inasmuch as the plan [of Mr. De la Haye] was never matured—a mere hint alone being given." Had the rival plan been itself matured, such an argument might have had some force, but in the circumstances it appears to Mr. De la Haye to be rather a two-edged weapon, inasmuch as *his* plan, though it might not be *perfect*, was not a mere hint, but had cost him "years of thought and months of labour," before a single experiment was made by Mr. Fairbairn to *mature* Mr. Stephenson's suggestion.

† Reported at greater length in the *Salisbury and Wiltshire Herald*, and also in the *Journal*.

cular styles, because they offended his notions. The professor then proceeded to observe that he had discovered some curious and very peculiar features in this cathedral. He had walked round the foundations two or three times before he noticed the peculiarity to which he would refer. The Chilmark stone, which is exceedingly beautiful, is laid on concrete; the masonry is of exquisite symmetry, and in fact, this church was the only mediæval structure with which he was acquainted, where the masonry was employed as a mode of decoration, by the uniform manner in which the courses of stone are laid. In our ecclesiastical structures the stones are laid as they come to hand; but in Salisbury Cathedral there is a regularity of design running round the masonry of the edifice. The courses of stone are not the same in thickness, but they follow a certain law. First, there is a band of large stones—then, a course somewhat narrower; and so followed on the courses, in strict symmetry and arrangement. The professor then stated that he considered that that portion of the church eastward of the nave was the first part which was completed. It must be recollected that the church was nearly forty years in erection, and that during that time the work appeared to have lagged; there was evidently a pause between the nave and the east end and transepts. He considered that the nave was erected at the latter end of the thirteenth century. It must be recollected, that five years after the foundations of the church were laid, several altars were erected. The whole of the Lady Chapel had been completed, and was first consecrated in the time of Longespee. In another point of view the church is favourable to the study of Early English architecture in this country. In France there are several cathedrals, the foundations of which were laid about the same time. Professor Willis then exhibited drawings of Amiens and Salisbury Cathedral, the foundations of both of which were laid in the same year; and commented upon the peculiarities of each edifice, and upon the growth of the pointed arch. He then proceeded to state that ecclesiastical architecture in this country was derived from the French—Canterbury Cathedral being erected from the designs of William of Sens, a Norman; this cathedral being the type of edifices in the Norman and transition period. All the great steps in ecclesiastical architecture, from the Norman to the Decorated style, were made by French architects, until we come to the Perpendicular, which was the growth of this country. This was not a mere theory; it was matter of history. Why should it be supposed that a change which took place in the style of architecture all over Europe was invented in England?

Professor Cockerell read a paper on

THE SCULPTURES OF THE CATHEDRAL.

The professor commenced his remarks by observing that sculpture was the right hand of architecture during the middle ages; and might be regarded as an epitome of the manners, habits, and customs of the period in which it was executed. There were amongst the sculptures of this church some "sleeping beauties" which had been too much neglected; and this neglect was to be deplored, inasmuch as these works were of great historical value. It would be found that they were anterior to the period of Italian art, and were not inferior to the great works of the masters of that school. The cathedral of Salisbury was commenced in 1220, and completed about 1258; its builders were desirous of illustrating the glories of the Old and New Testament, of the apostles and martyrs; and the west front was the page on which this object was inscribed, there being upwards of 160 statues ornamenting the exterior of the cathedral, 123 of which adorned the west front. On the buttresses there were still four remaining. The two minor buttresses to the north and south contained monuments of the Count of Salisbury and Bishop Poore. On the south end of the west front was a statue of Peter holding a scroll—the drapery of this figure was very fine. On the other side was Paul, holding the pommel of a sword. Underneath was a figure of John the Baptist, and opposite a figure of John the Evangelist, it being a common practice to represent them in juxta-position. These were the only figures on the buttresses. The west front formerly contained the twelve apostles and other members of the holy family. On the north side was an elegant statue, evidently representing Stephen holding a stone in one hand, and in the other a palm branch, the symbol of martyrdom. There was an altar in this church dedicated to this saint. In a niche on the northern side is a statue of Archbishop Langton, who was one of the coadjutors of Magna Charta, and who was present at the dedication of this church. This statue is an elegant figure, and held in the right hand an episcopal staff. The lecturer then proceeded to point out the historical sculptures of the extreme north and south ends of the west front. At the south was a figure in a secular dress, which was remarkably well executed—and there could be but little doubt that this was intended to represent William Longespee (Count of Sarum, and the natural son of King Henry II. by Fair Rosamond Clifford), who had laid one of the stones of the cathedral. If they compared the execution of these works with those of contemporary art, they would find them greatly superior. There was more suavity and grace in these figures than in those of the west front of Wells. Here there was a masterly display of drapery—the execution of which was superb. He had last year visited the cathedral of Amiens, a contemporary structure, which contained many sculptures—but those of Salisbury were superior. He was quite sure that many persons in looking at these figures would be reminded of the works of Greek art; and if they were compared with the sculptures of the great Italian masters—Giotto, Cimabue, and others—to whose works these sculptures were anterior—they would not suffer by the comparison. But it has been asked, were these works executed in England? He would give a few reasons for their being of English workmanship. There were 600 statues in the west front of Wells cathedral, the works of which were going on at the same time, as also were those of Lincoln, York, Durham, and at many other English cathedrals. It was therefore perfectly ridiculous to say these sculptures were executed by foreigners, and not by English hands.

Mr. Richard Westmacott read a paper on

THE MONUMENTAL SCULPTURES IN THE CATHEDRAL.

The lecturer, after pointing out the origin of monumental sculpture in this and other countries, proceeded to sketch the peculiarities of the monuments in the cathedral,—where specimens existed from the earliest period of monumental sculpture in this country, down to the time when a corrupt taste prevailed—viz., from the twelfth to the seventeenth century. The first object of a monument was to denote the fact that a body was buried; the second to denote the quality; then regard was had to the individual figure, and sometimes an inscription was added, containing the name and rank of the person. Of this kind of monument there were several very interesting examples in the nave. From the 5th to the 12th centuries the church exercised a very dominant influence over monumental sculpture, and compelled a similitude of style, and consequently most of the specimens are of a devotional character. One of the most interesting monuments in this cathedral is that of William Longespee, Earl of Salisbury, the under part of which is of wood; and no one who beholds that ancient relic can fail to be struck with the simplicity and repose of the figure. The details are well carried out, and the turn of the head is well executed. Mr. Westmacott then referred to the monument of Bishop Bridport in one of the transepts, to the Audley monument, and then proceeded to refute an observation which had sometimes been made, viz., that the art of monumental sculpture had declined in this country in consequence of the Reformation. He also proceeded to show that the best works of monumental sculpture were erected in an age when religion and morals were at a low standard, and in an age not deeply imbued with religious feeling. These works were, in fact, erected in an age inferior to our own in piety. He believed that the piety of the people of this country was as pure and unaffected in the seventeenth century—when monumental sculpture was not so pure and chaste—as in the days when the monument of Longespee was erected. The fact was, that the piety of the age had nothing to do with the matter. He then proceeded to point out the causes of the change which came over Christian art, ascribing it to the revival of classical literature, which changed the taste. Hence classical subjects were introduced in religious art; and imitations of the sculptures of ancient Greece, and subjects from the heathen mythology, were employed to illustrate modern art in Christian churches. This was called taste; it was, however, the absence of all taste. He then proceeded to condemn the affectation for mediæval subjects in Christian churches, and protested against copying rude efforts of art, which were very interesting, as illustrating their own age, but served only to degrade art, when imitated in our own times.

## HOW A CHURCH SHOULD BE BUILT.

PROPOSED CHURCH, SANDFORD DISTRICT, CHELTENHAM.

In the course of a replication from Mr. Brandon, for the whole of which we have not room, he says—Mr. Philipps writes that I give no data for coming to the conclusion that a church cannot be properly built to accommodate 1,000 persons for 4,000*l*. The only possible data which I can furnish in a letter, is the assertion of my experience on the subject, and having devoted considerable attention to church building, I believe I can form a pretty just opinion thereon.

The question, however, turns not upon how little a building can be erected for to be called a church, but upon, how a church ought to be built? My answer to that is, in the very best and most suitable manner that the science of the architect and the nature of the materials will admit,—I do not say, as an essential, in the most ornamental, though that would be a desideratum; but surely the only buildings that we can feel assured will be required by all future generations should be, of all others, erected in the most enduring manner possible, and the sacred purpose to which they are dedicated, should be sufficient to claim for them the very best of materials and workmanship. Unless these conditions can be complied with when church accommodation is required, I should recommend the erection of a temporary building, not to save the present generation from the expense of building a proper church, but merely as a substitute for such a building till the funds could be collected for it, and as a means of obtaining such funds.

I must here also allude to an expression contained in a private letter to me on the subject, from one of the members of the Committee, which I should not make mention of but that it probably expresses the general opinion of the committee. The writer, after referring to a church that was in the course of erection to accommodate 1,000 for 5,000*l*., goes on to state, that "a much smaller building than this would, with the usual number of galleries, contain 1,000." I must confess I am ignorant of what is the usual number of galleries for a church, but know that one is one too many.

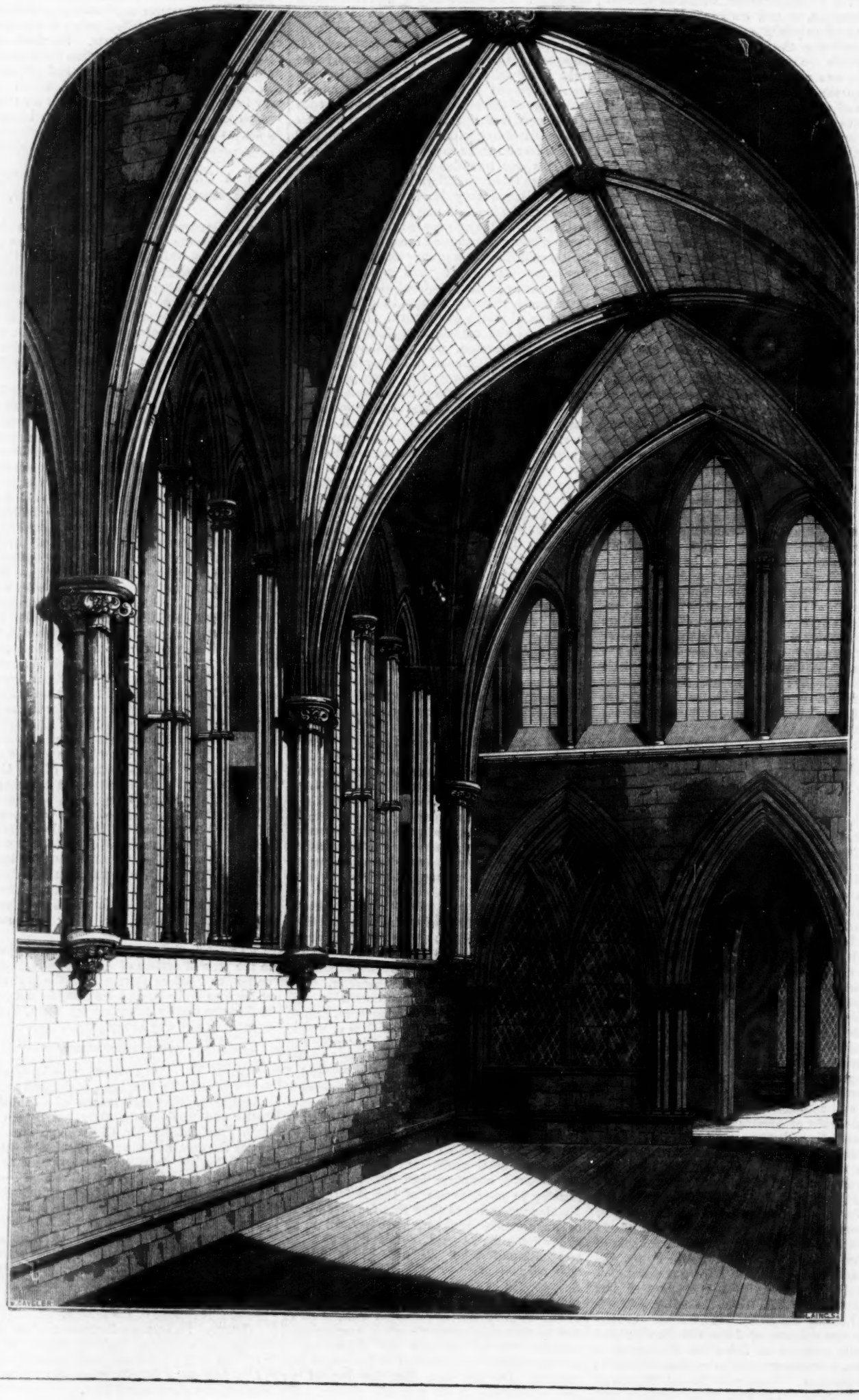
As regards the amendment which is required in the present system of competitions, it must be left, as I before observed, to the profession at large to make it, and I should be delighted to find the matter taken up by them, and to assist it in any way in my power.

BATHS AND WASHHOUSES.—At Chelmsford a committee has been appointed to consider the propriety and means of establishing baths and washhouses there. A design has been provided by Mr. Chancellor, who estimates the cost at between 3,000*l*. and 4,000*l*. The following details of the proposed design are from the *Chelmsford Chronicle*:—The façade consists of a centre building two stories high, and two wings one story high. The ground-floor is rusticated with a Roman doric portico, and an arcade with pilasters of a similar character continued along the wall, with circular-headed windows. An Italian tower for ventilation, with an exterior gallery, rises from the centre of the buildings, and is a prominent feature of the design.

GUTTA PERCHA.—Recent advices from Singapore announce that the supply of this article is still on the increase. Some imports of it had been latterly received from a new source, at a place called Coti.

## CHAPTER HOUSE, CHESTER CATHEDRAL.

[See page 361, in present number.]



## PORTLAND BREAKWATER.

THE foundation-stone of this national work was laid by Prince Albert on Wednesday week. The stone was a block weighing 14 tons; it was suspended by an iron chain, and being let slip after a bottle containing a plan of the breakwater, specimens of the coinage, &c., had been deposited, fell to the bottom of the sea, in the midst of a drenching shower of spray and a noise like thunder.

The construction of this breakwater, as many of our readers are aware, is not a new idea. It was first proposed by Mr. John Harvey, mechanic to George III., and afterwards postmaster at Weymouth; and after whose death the subject continued in agitation partly by the efforts of Mr. Harvey's son. The attention of Government, however, was not steadily fixed upon the matter until 1846, when the Refuge Harbour Commission reported very strongly in its favour. But the work was not decided on, even then, until a second commission had confirmed the recommendation of the first, and pointed out the advantages which the proposed breakwater would secure. The necessary surveys were then made, and powers for the compulsory purchase of land obtained by Act of Parliament, after which Mr. Rendell, civil engineer, was authorised to prepare a design of the work. As planned by Mr. Rendell, it will shelter an area of 1,822 acres from the only wind to which it is exposed. From the eastern point of the island, it will run out 1,500 feet in an easterly direction, and then going off at an angle will be carried 6,000 feet to the north-east. At the angle there will be an opening of from 400 to 500 feet for the use of steamers and small craft, but the whole work will be 7,900 feet, or one mile four furlongs in length. Of this more than 7,000 feet will be built in from 5 to 8½ fathoms' depth at low water. Of the whole area there will be 1,544 acres having not less than 5 fathoms' average depth, and 1,072 acres with 6½ fathoms' average depth, thus making accommodation for the largest channel fleets and convoys known during the last continental war. From the facilities which the stone quarries on the island afford for the work, and the intended employment of convict labour for quarrying the stone and loading the waggons, the estimated cost is only 560,000*l*. A railway, with three inclines, drums, wire ropes, &c., will raise or lower the waggons, and carry stones from the top of the island to the spot where they are dropped into the sea. By means of self-registering 'weigh-bridges,' the weight of stone put into the breakwater can be exactly ascertained.

There are upwards of 500 convicts or workmen now on the spot, and it is said there will be shortly in all 800 employed, some in quarrying, others in squaring stone, others in making new roads and levelling the quarries for laying down the rails preparatory to the removal of the stone to the breakwater. The establishment, which can only be seen by an order from the Secretary of State, is constructed chiefly of wood and iron, so that it may be taken down and removed on the completion of the breakwater. Each man has a second separate sleeping cell, about 7 feet long by 4 feet wide and 7 feet high. These small cells are ranged four stories high, and open into four spacious halls which are so placed as to be under inspection from a central corridor, where the officers are stationed. All the necessary offices are placed in an adjoining building, where there is a large cookhouse, washhouse, and drying-shed, baths, &c. The large chapel and other buildings are still in progress. The building is now inclosed by a lofty wall at the edge of the quarry. On the outside are houses for the governor, chaplain, and superior officers; and extensive ranges of cottages for warders and others. There is also a large infirmary, protected from the prevailing winds by having been built in a large quarry. Instead of going to the expense of breaking up the large stones, and levelling the yard where the sick will take exercise, the rocks have been left, and a party of convicts, under the direction of a governor, have made walks among them. There is a gasometer from which all the buildings are lighted, and the supply of water is pumped up from a reservoir about 350 feet below the top of the rock.

## CONSTRUCTION OF GREENHOUSES, &c. WITH METROPOLITAN BUILDINGS' ACT.

As doubts exist in the minds of not only builders and proprietors, but the district surveyors themselves, as to the requirements of the act in respect of greenhouses and such erections, it will be useful to give the decision of the referees (Messrs. Hosking and Poynter) in a recent case.

A conservatory was in course of erection for Mr. John Meek, against the back wall of a dwelling-house in the Peckham-road, district of Camberwell, and a requisition was forwarded to the referees, setting forth that the frames and sashes of the said conservatory had been prepared in wood, and that it was proposed to fix the same on dwarf brick walls on two sides, and to inclose the conservatory on the other side by a party wall; to which materials the district surveyor objected, being of opinion "that the bearers of the roof, and the angle and door posts ought to be made of fire-proof materials." At the hearing, it was stated "that the wall which will enclose one side of the said conservatory is a party fence wall, and that the bearers of the roof thereof for carrying the running sashes, will not be let into the external wall of Mr. Meek's house, which will enclose the said conservatory on another side; and the district surveyor stated that the said conservatory is intended to be 14 feet high in the highest part and is to be built as an addition to the dwelling-house with which it will communicate internally, and that it is to be heated by pipes from a boiler within the dwelling-house; and he contended that the sills and the bearers of the roof of the said conservatory ought to be of fire-proof materials, and that the outer quoin and the piers against the back wall of the house, and against the party fence wall, ought to be of brickwork, in order that the frames of the sashes might be set in reveals." The official referees awarded that it would not be contrary to the Act to build the conservatory in the manner and of the materials proposed, "provided that the party fence wall by which it is intended to enclose the said conservatory on one side thereof, and which by the erection of the said conservatory will be converted into a party wall, be carried up to the height required for party walls by Schedule D, Part 3. of the said Act, and be otherwise made conformable to the rules of the said Act with reference to party walls."

## THE CANYNGE SOCIETY AND ST. MARY REDCLIFFE CHURCH, BRISTOL.

WE have already spoken of the Canynge Society as having been established to assist in the restoration of that fine structure St. Mary Redcliffe, Bristol. On Thursday in last week the second anniversary meeting was held, when the active and able Mayor, Mr. J. Kerle Haberfield, presided, and 60 or 70 of the leading citizens assembled. From the report it appeared that nearly 500*l*. were raised by the society last year, and had been applied in the clerestory of the chancel, and that the amount of subscriptions for the current year has increased as much as could be expected.

The chairman performed his task well. The Rev. Mr. Whish, Mr. R. P. King, Alderman Pountney, Mr. W. P. King, Mr. Garrard, the City Chamberlain, Alderman Wyld, Mr. G. F. Powell, and others addressed the meeting, but we must confine ourselves to a few memoranda which may assist the cause.

Mr. Proctor, the chairman of the Restoration Committee, made a strong and able appeal in favour of the church. He said it was now some years since they first endeavoured to impress upon their fellow-citizens the necessity of attending to the noble fabric for whose restoration they were associated. The dilapidations then going on could no longer be trifled with; but now, by the kind contributions of their fellow-citizens, the committee had been enabled to grapple with the evil, and to render the fabric secure at all events, and he did feel that with the assistance of the society they would be enabled very much to hasten the complete and perfect restoration of the church. He said "complete and perfect," because he felt assured that it would be impossible, now that general attention was drawn to the work, but it must be so, and it ought in common credit to themselves to be speedy: it was the finest monument they possessed of the past, it was the most magnificent specimen of architectural beauty in the city, and what was it used for? to offer up thanksgivings and ask for future blessings. For what, too, did they ask? was it not for the prosperity of themselves and their land? And if they so prayed, was it creditable for them to allow the building in which they did so to fall in ruin before their faces? If it were necessary to say more, he would venture to add, though they were doing much toward the prosperity of their city, there was more than at first view appeared to be the case in the restoration of St. Mary Redcliffe, as regarded its conducement to that effect. If only as a matter of example, it was of great importance. The proper restoration of St. Mary Redcliffe would offer them an example which would stimulate them in the erection and maintenance of other public buildings, for no one could see the perfect beauties of that structure without being better educated in the beautiful, without feeling the power of beauty so strongly that they would not be able to tolerate the erection of such public buildings as would be a discredit to the city. Redcliffe Church was now seen black and bedizened with dirt, and yet they asked the poor to clean their houses: ought they not to restore this building, and give a tone and example to the poor? He wished he could impress upon them lines written in the days of yore, and make them feel their truth. The work then would be soon done:—

> "If thou wouldst see famed Bristowe in full prosperitie,
> Take heed thou keep'st faire Redcliffe in true sinceritie."

The architect, when his health was drunk, said he was sure they would exonerate him from any suspicion that self-interest alone led him to advocate the restoration of the church. He did not look upon the restoration as a matter of pounds, shillings, and pence. He believed that any architect who sat down to design or restore a church with no higher motive than 5 per cent. would not be likely to produce any effective results; and, indeed, he believed he would not be competent for the task at all. The church was most beautiful even in its ruins, although he hoped before a very long time to be able to show it as it had been. He had examined most of the noble structures in the low countries, in France and Germany, and he did not recollect one which surpassed in parts St. Mary Redcliffe. He had a full recollection of the beautiful feathery spires of Antwerp and Strasburg Cathedrals, of the sublimity of Notre Dame, and the richness of Chartres, but still he maintained that the tower of St. Mary Redcliffe was second to none. For piquancy of fancy he knew nothing throughout Germany or France which could compete with its north porch; if they looked at it foot by foot, it displayed the most extraordinary evidence of the fancy and genius of the old architects; every corbel was different, and manifested a degree of care and attention, an imagination and a fire that could not be surpassed; it was designed by men who knew what they were about, and carried out by others with heart and soul. It gave him great pleasure to see the way in which the workmen were pursuing the work, and if they continued to go on in the way they had began, they would soon see the north porch as beautiful as ever. The necessity for the restoration had not taken that hold of the citizens of Bristol that it should have done. Love of country, love of the beautiful, love of God, too, should tend to make it an object of desire. Lord Palmerston the other night electrified the House of Commons by stating that public opinion was stronger than arms and cannons; that if public opinion was founded on justice and truth, arms and cannon would disappear before it. Let them, then, bring public opinion to bear on the present question, let it be shown that such a building was a means of education,—and this point had been too much neglected,—let it be shown that the contemplation of a fine building has an exalting effect upon the mind, and he was sure that enough of public spirit would be excited amongst the wealth and intelligence of the city of Bristol to enable them to effect the restoration, and that speedily.

An excellent sermon was preached by the Rev. Canon Harvey previous to the dinner; and it was announced that the Duke of Beaufort had accepted the office of president for the ensuing year.

## ARCHITECTURAL CRITICISM.

DOUBTFUL as I am whether you will allow the remarks I am about to make to appear in THE BUILDER, I nevertheless send them. I cannot agree with you in thinking—as you appear to do—that "such men" as Sir R. Smirke, Mr. Barry, and Mr. Blore, are not to be spoken of unreservedly as regards their professional doings. On the contrary, I am of opinion that "such men" can best of all bear to hear the voice of honest criticism. If those who have been signally favoured by opportunities, and who have been employed on works of especial mark, cannot bear to have their works fairly submitted to critical examination, who can? They are, or ought to be, fully prepared for criticism, as what they must expect; and those alone have reason to deprecate the exercise of it who are conscious that their works will not endure its scrutiny.* For Sir Robert Smirke, indeed, there is this excuse—that in *his time*—namely, a quarter of a century ago, when he commenced operations at the British Museum—he could not have the wholesome fear of criticism before his eyes, because nothing deserving the name of architectural criticism then existed. There was then no vehicle for it—not a single architectural journal—but all was then a dead calm, as far as criticism is concerned, because nearly all were then in a dead sleep. For rousing us out of such a state of torpid indifference, we have to thank the late Mr. Loudon, who did much to popularise architectural criticism, not merely by his *Magazine*—the first periodical of its kind—but also by other publications. His policy—and most excellent and liberal it is—was to promote discussion,—to allow both sides to be heard, and even his own particular opinions to be freely called in question by any one who thought proper to do so; he being aware that it is only by the collision of opinions that prejudices can be removed, imperfect notions corrected, and erroneous ones exploded.

In the paper on "Architectural Criticism," in your last number, it is very justly said,—"Good criticism is a means by which the taste of masses may be greatly improved;" and not that of the "masses" only, but of the profession also. It could be wished, however, that the writer had expressly defined what "good criticism" is, and what is to be understood by it, instead of contenting himself with doing so only negatively, by giving us an instance of what he calls "negative criticism," which does not deserve to be called criticism at all, but should be left to *Punch*, and to those who, for lack of criticism, indulge in such small-witted facetiousness as is that of comparing spires to extinguishers, tozza fountains to dumb-waiters, and window pediments to cocked-hats.† What I myself understand by "negative criticism" is that which, whether it be unfavourable, or, as frequently happens, quite the reverse, amounts to nothing more than the bare expression of opinion, without any attempt at fair and rational argument in support of it. It is not enough that, either way, the *opinion* itself be perfectly valid and just,—it does not become criticism unless it pronounce its judgment after an impartial estimate.

The absence of thoughtful, intelligent criticism operates disadvantageously in more ways than one. One great source of the interest attending architecture is cut off; getting no more than summary verdicts as to the merits or defects of the buildings that happen to be spoken of, the public may, indeed, admire or condemn just as they are so directed, yet remain just as uninstructed as before. Another evil is, that unless criticism be freely exercised professional men feel themselves, on the one hand, secure from open reproach for their faults; and on the other, little encouraged to exert themselves to the best of their ability. He who can set at nought idle and ignorant censure is also most likely to reject with scorn that sort of hackneyed praise which betrays itself to be either mere complimentary notice or indiscriminating adulation—hyperbolic in its language, perhaps, even to fulsomeness, but cold in feeling, and totally devoid of all heartiness.

It is, moreover, owing to the lack of a sufficiency of sound architectural criticism, and the consequent ignorance that prevails generally as to architecture itself, that many who are more or less unqualified to do so, venture to put forth off-hand opinions and crude remarks as criticism, they knowing that they may do so without the slightest fear of being contradicted or gainsaid. We certainly do frequently find the most one-sided—if not actually absurd—observations made, yet suffered to pass unrebuked, consequently, to all appearance acquiesced in, which would not be the case were criticism to be properly exercised. *Exempli gratiâ:* When Mr. Fergusson calls the new building at Buckingham Palace "hideously ugly," he quite overshoots the mark, and does not bring against it those real and valid objections which he easily might have done. Had the same design been executed as a façade for a range of houses any where in Belgravia, it might then have been called handsome—certainly would have been of superior quality to any of the architectural doings in that quarter; whereas, as the principal or public façade of a royal palace, it is so totally destitute of all those qualities which should stamp one, as to be, when its purpose is considered, most unsatisfactory, undignified, commonplace, and dowdy; and surely a considerable difference there is between being dowdy and "hideously ugly."

ARTI FIDELIS.

* Our correspondent misunderstands the remark,—or appears to do so. Our objection was not to criticism, but abuse.—ED.

† It is due to the author of the paper in question to say, that only part of it was printed in THE BUILDER.

## THE DRAINAGE PLAN.

ALLOW me to correct Dr. Buckland's statement that "the London clay glanced off at the north-east corner of Saint Paul's," by ascertained facts.

Section at Black Swan-alley in Saint Paul's churchyard:—

| | Ft. | In. |
|---|---|---|
| Made ground | 11 | 6 |
| Yellow clay or loam | 4 | 6 |
| Sand and gravel | 18 | 6 |
| Blue clay cut into | 0 | 6 |

The gravel and sand was completely full of water. It had no tendency to run, for sharp sand, when water-laid, does not run. The whole of this water was pumped out by a steam-engine, and wells drained on the north side of Saint Paul's churchyard, in Saint Martin's-le-Grand, and in Newgate market, yet no building was in the least injured, simply from this circumstance, that sand containing water is as compact as it can possibly be, the water only fills the interstices, and its removal does not affect the solidity of the stratum.

Section at 24 feet from the south end of Princes-street, Bank:—

| | Ft. | In. |
|---|---|---|
| Rubble and brickwork | 10 | 0 |
| Black soil (bog) | 8 | 0 |
| Yellow loam | 2 | 0 |
| Gravel | 8 | 6 |
| Blue clay cut into | 4 | 0 |

at 48 feet further north, and for more than 60 feet still further:—

| | Ft. | In. | Ft. | In. |
|---|---|---|---|---|
| Rubbish | 11 | 0 | | |
| Black bog earth of the ancient Walbrook | 22 | 0 | to 22 | 6 |

Cut into, and the blue clay just touched.

At 28 feet south of the London Dock House:—

| | Ft. | In. |
|---|---|---|
| Rubbish | 12 | 0 |
| Loam | 11 | 0 |
| Gravel | 14 | 4 |
| Blue clay cut into | 4 | 0 |

The blue clay underlies Moorgate-street, and has been cut into 5 feet 6 inches in depth, and in King William-street it has been cut into to a depth of 10 feet.

In Fenchurch-street the gravel has been cut into; in Aldgate High-street the loam has been cut into, and sand reached, and it is all but an established certainty, that beneath the London loam or gravel there is blue clay.

These I know to be facts, therefore I assume that the doctor has not spoken of his own knowledge, and venture to impugn so great an authority, merely from a desire that any project for getting rid of the foul pollution of the Thames should not be injured by unsupported assertion.

It is very doubtful if Philips's proposition can be carried out, but out of it something practicable may grow. Z. Z.

Mr. Bardwell has forwarded a communication on the subject of a plan laid by him before the commissioners at their first sittings. The writer says,—It was simply three intercepting sewers, at a depth of one or more feet below the lowest existing sewer. The first embraced nearly all the sewers in the old Westminster commission, and commenced at Charing Cross, running down Whitehall, Parliament-street, Millbank, Lupas-street, Chelsea Hospital Gardens, Cheyne-row, and emptying itself into reservoirs near the Kensington Canal. The second commenced at Northumberland-street, running beneath Hungerford-market, the Adelphi and Somerset House, through the Temple Gardens to Earl-street, along Thames-street and the Lower Ditch to East Smithfield, High-street, Shadwell, and along the banks of the Bromley Canal to Bromley Common. The third, the Surrey division. Its sewer commenced at the Effra, ran along Vauxhall-row Princes-street, Palace New-road, York road, Stamford street, Bankside, Tooley-street, Jamaica-row, to the reservoirs near the King's-road, Bermondsey.

From the depôts the sewage would be sent in pipes for irrigation at the proper seasons, and at other times the solids would be separated from the fluid by electric or chymical agents.

## NOTES IN THE PROVINCES.

THE chief stone of Romford New Church was laid on 26th ult. The old foundations have been used in front, but the walls are carried out at the back 10 feet further than the limits of the old site. The church is to be in the Decorated style, the walls faced with Kentish ragstone, with dressings of Bath stone, and will contain 1,110 persons. The length of the interior is 113 feet; the width 54 feet; the height to the roof, which is an open one, 54 feet; the tower will be 66 feet high, and the spire from the ground 140 feet. The total cost will be 5,850*l*. Mr. Johnson is the architect, Mr. Kelk the builder, and Mr. Gibbons the clerk of the works. A view of the church has been published.——From recent reports it appears that that great bore the Northam Artesian well, near Southampton, has now been bored to 353 feet in depth. The progress has been impeded by a stone 22 inches thick, and the supply of water had decreased through the decay of the rods.——In a recent lodgement of tenders for repair of conduits belonging to the Southampton Water Works Company, it was found that "Mr. Howell's tender was 82*l*. 10s., while that of Mr. Metcher was only 39*l*.; the others varying from 61*l*. 16s. to 79*l*. 17s." Mr. Metcher's tender was accepted. It appeared, says a Hampshire cotemporary, that the miscellaneous repairs had amounted to about 75*l*. a-year.——A Bristol lady has bequeathed 4,000*l*. to found a school of arts in that city.——Kemerton Church, says the *Bristol Journal*, is again in course of restoration. The north aisle has now been taken down, and the whole interior of the building, with its Norman columns, exposed to view. The Norman arcade is, it is said, to be removed.——All Hallows-on-the-Walls, Exeter, has recently had stained glass inserted in the south window of the chancel.——Abberley Church is to be rebuilt and enlarged, Mr. J. Moilliet having got designs, and offered to supply whatever may be deficient in the requisite sum (2,500*l*.), to be raised by subscription, and the proprietress of Abberley-hall, the mother of the same gentleman, supplying the stone.——From the Liverpool Dock Surveyor's report it appears, that the remainder of the north docks are in a forward state, and that 232,374*l*. odds have been expended during the past twelve months on the new works, besides 20,610*l*. for dock repairs.——The parish church of Huddersfield has been generally repaired, and the interior newly painted in oak, &c., varnished, and emblazoned with heraldic crests in white and gold.——A column is to be erected on a height near

Ulverston to the memory of Sir John Barrow. ——The new church of Seghill, says a Newcastle paper, was consecrated on Saturday week. It is in the Early English style, and will accommodate 530 persons, mostly free. The cost of erection and site is about 1,700*l.* Mr. John Green supplied the design.——Another small church was consecrated on Tuesday week at Newton Arlosh, parish of Holme Cultram; one at Skinburness on the day following; and on Thursday one at Mowbray, near Allonby.——A model lodging-house has been formally opened at Aberdeen, under the auspices of the Lord Provost. Charges per night 3d. a-head.

## RAILWAY JOTTINGS.

ABOUT 3,000 tons of a cutting near Warmsworth church, on the South Yorkshire line, gave way on Monday week, leaving a void about 30 yards in length and 10 in breadth, extending from the top to the bottom of the cutting. The sides of the gullet are said to have been too perpendicular, but the late rains are chiefly blamed for the result. Another large portion was left in a very critical position, with a large fissure nearly 50 yards further off.——The pressing necessity for the free transit to guards along a train was instanced lately, as it so often is in one way or other, in a case where the tire of a wheel was gone and the carriage off the line. Although the luggage-van with the guard was at hand, and the guard was at length made aware of the danger to those within the carriage, he stood in the absurd position of a 'guard' without power to afford the least assistance, while the train was running at the rate of 25 to 30 miles an hour. 'Bawling till hoarse' to the driver was of no use; and the carriage was dragged on for a number of miles, with the passengers in continued and unenviable consciousness of their imminent peril, till the train eventually stopped.——Since the opening of railways, the useful article, milk, has flowed into Liverpool in such abundance that the 'genuine article' now costs only half what its anomalous representative used to be sold at in stinted quantities.——On the list of applicants for situations on the Manchester, Sheffield, and Lincolnshire line, there are upwards of 800 names!——A Liverpool merchant, complaining in the *Times* of the 'extraordinary delay' of the Electric Telegraph Company on a recent occasion of commercial importance, says,—"It was a matter of great importance to numerous parties both in Liverpool and America that this intelligence should have been posted in that establishment in time for the parties interested to have included the fact in their communications by the American mail steamer sailing on that day. It is remarkable, however, that on the Saturday, when the steamer sails at an earlier hour —the very day on which it is necessary that news should be posted early—the telegraphic intelligence is not posted till the steamer is away."

## METROPOLITAN COMMISSION OF SEWERS.

A SPECIAL court was held on Thursday 26th. The Earl of Carlisle in the chair.

*The appointment of a new Order Clerk.*—The report of the general committee on the appointment of a successor to Mr. Hertslet, as order clerk, was brought up and read. It stated, that it having been considered desirable that a person having a knowledge of the law should be selected, the committee were unanimous in opinion that Mr. Woolrych, of the Inner Temple, should be recommended to the court as a fit and proper person to fill that office.

After some conversation Mr. Woolrych was appointed.

The Earl of Carlisle said he could not, on this occasion, forbear to convey the general sentiments of the court to their late officer, Mr. Hertslet, and their deep regret at the circumstances that had led to their separation from him.

*The Cholera.*—A letter was read from the Home Office, calling the attention of the commissioners to upwards of 600 complaints of nuisances and drainage made during the previous week by the inspectors of police of the various metropolitan and suburban divisions.

These reports were referred to the surveyor. A memorial was presented from the inhabitants of Dulwich, in public meeting assembled at the Half Moon Tavern, complaining of the condition of that district, and stating that the fatal effects of the offensive drainage and open ditches had struck terror into the minds of the people, and calling upon the commissioners to cover over the open ditches.

The Earl of Carlisle remarked that they had been told by a deputation, a few days since, that in convering over an open ditch they had only aggravated the evil.

Some remarks having been made on the subject of the process of flushing,

Mr. Leslie said, there appeared to be great diversity of opinion on this subject, for last year their surveyor, Mr. Roe, had ordered flushing to be suspended, and he believed that it was so suspended for upwards of three months. Even their own officers were divided in opinion on the propriety of it. Mr. Lovick was in favour of it, while Mr. Gotto was opposed to it, and in a report had set forth that this practice only aggravated the evil it was intended to cure. Mr. Leslie then deprecated the practice of coroners holding inquests on persons dying of bowel complaints, which statements were got hold of by the reporters, and great and unnecessary alarm was created amongst weak-minded persons.

Mr. Chadwick supported the system, but contended that the operation ought to be superintended by a competent person, as had been recommended in the second notification of the Board of Health.

Mr. Lovick and Mr. Gotto having expressed their opinions for and against flushing in particular cases.

Dr. Southwood Smith said it appeared to be overlooked the difference that had taken place in the mode of cleansing by means of a discharge of the cesspools into the sewers, and the old mode of cartage. He thought the court should investigate the matter, whether there had really been an injury or not; but without medical testimony, to go into such investigation would be quite absurd.

*The Tunnel Sewer for the Metropolis.*—A question was referred by the Finance Committee as to the payments to be allowed to surveyors and others for the cost of surveys, levels, borings, &c., undertaken with reference to plans for the drainage of London.

Mr. Hawes said the reason for bringing this before the court was an impression on the mind of the Finance Committee, that at the last court when the subject of the tunnel sewer was under consideration, it appeared to be the opinion of the court that no expense should be incurred in the production of plans, &c., for the same. Now, certain charges on this score had been sent in to the committee, and they wished the opinion of the court as to how far they were justified in allowing the same, and paying the expenses incurred.

Mr. Chadwick thought they should give a liberal interpretation of the orders of the court in the payment of small incidental expenses, relying on the discretion of the officers as to the amount of them.

A member remarked, that as the Ordnance Survey Committee had already ordered borings to be made for the purposes of Mr. Austin's plan in Orchard-street, Westminster, it would be only fair to allow Mr. Phillips the same advantages. He wished to ask Mr. Austin what sum had been expended in these borings?

Mr. Austin said that they amounted to about 70*l.*

Mr. Bullar read an extract from a letter received from Mr. Hutton, who, he stated, was an eminent geologist, and who gave it as his opinion that the plan was impracticable; in fact, the difficulties were so great as to discourage any one but a madman or an ignoramus, and as to boring with a view to information, it would be only so much money thrown away.

The Earl of Carlisle thought all parties should have fair play, although he was unwilling to incur any preliminary expense.

Mr. Leslie said the parties who commenced the first tunnel under the Thames in 1804, got within 150 feet of the opposite shore without laying a single brick. They proposed to brick as they went on, and if 940 feet could be done without bricks at all, he did not think the difficulties insurmountable. Geologists were fond of riding their hobby, and such being the case he would only be satisfied from borings, especially as he knew that in digging a well for Greenwich Hospital, they got into chalk at 100 feet. If they got into the chalk he apprehended there would be no difficulty in forming a tunnel through it with the assistance of their engines in pumping out the water that might make its way during the progress of the work.

Mr. Phillips stated, unless he was allowed the borings, that he should be brought to a stand-still, and his plan would at once fall to the ground. They would cost from 150*l.* to 200*l.*

Mr. Bullar said that the public would be unwilling to go to 2,000*l.* or 3,000*l.* expense for them; for, if Mr. Phillips's was not the best plan in an engineering point of view, the expense of borings would be thrown away. He complained that the subject had been hurriedly forced upon them, and that a "row" had been got up out of doors. That paper, the *Times*, he said, had taken the lead in this; but now, in consequence of the discussion that had taken place at the last court, they began to think that there were difficulties in the way, and were anxious to back out of it. However, he trusted that in executing a work that was to last for ages, they would not be hurried on in its consideration, but would take their own course, independently of any newspaper whatever.

After some further discussion the following resolutions were agreed to:—

"That the expense already incurred for surveys, levels, borings, &c., referred by the Finance Committee to the court, be allowed."

"That, as Mr. Phillips states that 200*l.* will be necessary for all the borings, &c. requisite for his plan, the court sanctions his expending on them a sum not exceeding that amount."

## Miscellanea.

MURAL PAINTINGS, PLASTERED AND WHITEWASHED.—At Winchfield Church, Hants, recently, some workmen found, beneath a thick coat of plaster, the remains of painting which at one time appeared to have entirely covered the walls. The rector procured a respite, and Mr. Baigent, of Winchester, made tracings and drawings, produced at a recent meeting of the Archæological Association. Mr. Waller described the chief subject to be that of "the rich man and Lazarus," and stated that it possessed some artistic and religious interest. This, we are told, makes the fifth instance of the preservation, by the association, of church mural paintings found in Hampshire; but the spirit of destruction at Northwood Church, Isle of Wight, was too rapid for the conservative pencil of members who resided almost within call. Some frescoes, described as of a superior kind, were laid open a week or two ago, and a churchwarden, or some person invested with a brief authority, had them effectually destroyed. A representation of "the last judgment" in Shorewell Church was re-whitewashed about three years since, while a gentleman was engaged in making a copy for the association; but the churchwardens have preserved the legend of St. Christopher, which the association has engraved.

BETHNAL GREEN.—A correspondent from the Mile-end-road, who signs himself "F. Creasy," draws attention to the state of premises in Cambridge-road, and complains of want of attention on the part of the local board and the Metropolitan Sewers Commission after repeated application. He says: "The houses have a ditch running behind them, of which recently one of the tenants has stopped the the course: the result is, that a quantity of stagnant matter from the adjoining privies, accumulates frequently to the depth of 2 feet, which cannot be carried off except by the influence of the atmosphere. I think that from what I have stated there can be no doubt of the unhealthy and dangerous condition of the locality alluded to; if there be any such doubt, I would mention the fact of several visits from the superior board, who have always stated that it was so bad that were cholera to ensue, they should not be surprised; and since the last visit one of the occupants of the house No. 15 has died, which death the medical gentleman who attended him considers to have been accelerated by the unwholesome state of the locality."

DOOR-KNOB COMPOSITION.—Mr. John Harrison, Stillwater, Saratoga county, New York, has patented an improvement consisting in the compounding of the following materials, calcined, pulverized, and ground, viz.:—bone, 10 parts; black flint, 4 parts; crystal felspar, 10 parts; granite, 10 parts; Vermont white sand, 10 parts; China clay, 11 parts; chromate of potash, 1 part; litharge, 1 part; antimony, 1 part; chrome green, 1 part; oxide of iron, 3 parts; oxide of tin, 1 part; oxide of zinc, 1 part; oxide of manganese, 4 parts. The articles are ground in water, and constitute the body and everything necessary for the manufacture.

OMNIBUS STATISTICS.—From returns just made by the Commissioners of Inland Revenue, it appears that the total number of omnibuses now plying for hire in the metropolis is 3,000, paying duty, including mileage, averaging 9*l.* per month each, or 324,000*l.* per annum. The number of conductors and drivers is about 7,000, who pay annually 1,750*l.* for their licenses.

AN IRISH CALIFORNIA IN THE BOGS.—Mr. Jasper Rogers and his bog charcoal for deodorizing the metropolis, and thus effecting its sanitary reform, has been completely outshone by a light exhibited in the House of Commons—a veritable extract of bog, if not a solid concentration of will-o'-wisp. The O'Gorman Mahon, in calling attention to a development of the resources of Ireland,—one, he said, of the most important discoveries that had ever been made,—produced what he called a *spermaceti* candle made from Irish bog, though how the cetaceous sperm got into the bog it would be hard to say, but at least it appears to have been very like a whale sperm candle, and was examined with some curiosity by Lord John Russell and other hon. members. This the O'Gorman said, however, was but one of a number of valuable extracts which he enumerated, from the same fertile mine, —and he then appealed to Lord Ashley as to the truth of what he had stated. His lordship promptly responded by assuring the House that these substances, he had every reason to believe, had been extracted from Irish bog by Mr. Owen, the chemist,—a most trustworthy gentleman and a personal friend of his own. Mr. Owen had already invested a large capital in the Irish bogs, and had been carrying on his operations for twelve months. Out of every hundred tons of peat, the cost of which was 5*l.*, and 8*l.* more in labour, but take the cost at 20*l.*, the results, on which Mr. Owen staked his character, were these:—Carbonate of ammonia, 2,602 lb., value 32*l.* 10s.; soda, 2,118 lb., value 8*l.* 16s. 6d.; vinegar, 600 lb., value 7*l.* 10s.; naphtha, 30 gallons, value 7*l.* 10s.; candles, 600 lb., value 17*l.* 10s.; camphine oil, 600 lb., value 5*l.*; common oil, 800 lb., value 3*l.* 6s. 8d.; gas, 8*l.* in value; and ashes, 1*l.* 13s. 4d.: making a total of 91*l.* 16s. 1d. Moreover, the soil below is so saturated with ammonia as to be invaluable for agriculture. Englishmen, no less than Irishmen, may well rejoice if all this be no *ignis fatuus*. It unfortunately happens, however, that 20,000*l.* were long since *sunk* in Dartmoor bogs, in just such extractive efforts, but they certainly have not yet sprung up and fructified to perennial profit.

STEAM-HUSBANDRY.—The *Mark-lane Express* notices an interesting machine or combination of machines erected on a property near Shaftesbury. This machine (for it seems like one perfect whole) receives the sheaves, disengages the corn, clears it of all small seeds, rethrashes any ears that may escape the first operation, winnows it from the chaff, separates the best from the imperfect corn, conveys the best into the market sacks, deposits the tailing in another part of the barn, and passes the straw into the yard. It also accurately weighs the sacks of corn; and as the scale turns shuts off the supply; rings the call-bell, so that the man in attendance ties and removes the sack, replacing it by an empty one, to be filled and removed in the same manner. At the same moment a pair of mill-stones is engaged grinding corn, and producing meal for the consumption of the cattle; the dressing apparatus is not yet added. The corn-bruiser is also performing its part in the preparation of food for the stock. The chaff-cutting machine is in full operation, and the bone-mill at work. The whole of this machinery is said to be of the most simple construction, and not easily thrown out of repair. It is worked by a small steam-engine, not consuming more than 1 cwt. of coal per hour, and attended by one man.

THE CULLODEN MONUMENT.—Mr. Mackenzie, of Elgin, architect, has constructed a design for this monument, for the erection of which a considerable sum has already been subscribed. The model represents a large, irregular, broken, conical mass, in imitation of natural rock, round which is a rough road,—now winding through clefts, and now ascending by steps, seemingly water-worn, until it reaches a small flat on the top of the mass. In front, crowning a precipice, is a fine female figure, leaning on the rock, and mourning; with two boys, holding by her hand and skirts,—the young one looking anxiously up in her sorrowful face. In front of the precipice is rudely carved the word "Culloden, 1746." At various prominent points the model presents small tablets of various forms, to be erected by clans, or in memory of individuals.—*Edinburgh Weekly Register.*

BUILDERS' BENEVOLENT INSTITUTION.—The second annual general meeting was held at the London Tavern, on the 30th ult., Mr. Biers, the president, in the chair. The meeting was numerously attended, and was addressed by various gentlemen, who united in expressing their acknowledgments to the president for his perseverance and attention to the interests of the institution. The usual annual report was read, and adopted with all the more cordiality, inasmuch as it announced that, with the aid afforded at the anniversary dinner, which we lately reported at large, and when no less than 110 new subscribers, it seems, had added to the previous prosperous progress of the institution the goodly sum of 500*l.*, the Directors now felt themselves in the unexpected position of being already able to announce that they would give the subscribers an opportunity of exercising their privilege in the election of five pensioners, who, from October next, would each be granted the maximum rate of pension fixed by the rules, namely 24*l.* for males and 20*l.* for females. Such an announcement was regarded by the meeting as an unprecedented circumstance, considering the short time since the institution was founded. Some incidental relief to workmen disabled by accident is now also to be afforded. It was stated in the report that the institution now possesses 1,000*l.* stock in the 3 per cent. consols, in the name of trustees for behoof of the charity. All donations requiring, by the rules, to be funded, the directors wish to urge the increase of *annual* subscriptions as the main dependence of the poor objects of the charity and the chief hope of increasing their number. Earl Manvers was elected a patron, and a number of gentlemen vice-presidents. The usual votes of thanks were then accorded, and the meeting separated.

ESTIMATING—CHELMSFORD UNION.—The careless manner in which persons connected with the building profession appear to make their estimates being so often exposed and commented on in your valuable publication without effect, it would appear that either inexperience or recklessness must be the cause of such glaring inconsistencies. The following tenders for painting the above union-house were received by the Board:—No. 1, from Islington, 60*l.*; No. 2, 50*l.*; No. 3, 35*l.*; No. 4, 35*l.*; No. 5, 32*l.* 10s.; No. 6, 32*l.*; No. 7, 24*l.* 12s.—these six were from Chelmsford and its vicinity. At the previous board two architects sent tenders for superintending the above work, the one 1*l.* 1s.; the other 5*l.* 5s. In the early part of the year tenders were sent in for a wall containing three rods of brickwork, including a 1½ inch door and frame, also two privies with half a square of roofing and slating to the same, 112 feet superficial inch deal partition in the dormitory, painted both sides in three oils, with other minor works specified. The tenders were, No. 1, 48*l.*; No. 2, 46*l.* 10s.; No. 3, 41*l.* 10s.; No. 4, 41*l.*; No. 5, 40*l.*; No. 6, 35*l.* The last had it,—pray who was the winner?—A. B.

THE BUILDINGS ACT AMENDMENT BILL.—The Bill introduced into the House of Lords by the Earl of Carlisle, for the amendment of the present Buildings Act, has just been printed. It consists of 150 clauses and 12 schedules. It is brought forward (though too late as to legislation) so that any useful information may be elicited upon it during the recess, with a view of resuming the Bill at a very early period in the next session. We had prepared a summary of its provisions, but some of the clauses seem on a hasty inspection so singularly different from what we looked for, that we think it better to withhold the summary until such time as we can give the Bill consideration and express our opinions upon it. What the Committee, who at the request of Lord Carlisle reported on the amendments required, will say to it, we scarcely know.

INDEPENDENT COLLEGE, ST. JOHN'S-WOOD—COMPETITION.—Ten architects were invited by the committee to compete for the above college, including Messrs. Donaldson, Davies, Barry and Brown, &c. The Committee, assisted by John Shaw, Esq., of Christ's Hospital, have selected the design of Mr. Emmett for execution, and awarded the premiums to Messrs. Kendall, jun., and Pope.

PROJECTED WORKS. — Advertisements have been issued for tenders for works at a new pauper lunatic asylum at Powick, Worcester; by 21st inst., for pewing, repewing, repairing and altering, warming, &c., the interior of Northfleet Church; by 14th, for new walling to enclose addition to Jewish burying-ground at Mile-end; by 6th, for reglazing the nave windows of St. Mary's Church, Brampton Ash, Northamptonshire, in quarries, with old glass and new lead; by 8th, for additions and alterations at St. George the Martyr's workhouse, Southwark; by 7th, for working and maintaining permanent way and works of Blackwall Railway; by 1st September, for a considerable number of street cocks, fire cocks, or hydrants, and air valves, for Manchester water-works; by 6th, for paving and keeping in repair the streets, lanes, courts, &c., of St. Mary's, Rotherhithe; by 9th, for the reconstruction of the drainage and water supply, and for alterations and works, at Cuckfield Union Workhouse; and by 13th inst., for lighting with gas a portion of the district of St. John's, Notting-hill, Kensington.

SUSPENSION BRIDGE AT CHESTER—A NOVELTY.—Messrs. M'Kean, Perkes, and Co., of Liverpool, have designed and constructed a light Chinese-looking bridge for Earl Howe, near the Grosvenor-bridge, across the Dee, and spanning a ravine on a slight slope by 12 iron chain rods in links of 15 feet each, with a light-looking X shaped railing. The means by which this bridge is suspended are hid from view. The span is 150 feet between the bearings of the points of suspension. The platform is 7 feet wide. The chain rods are secured together by flat bars about 6 feet apart, on which the timber platform rests and is secured by T-headed bolts and nuts. The chains are made fast at one end to a stone pier built in the embankment. The centre of the pier at the other end of the bridge is formed into a large pit, on the top of which is secured a turn-barrel, round which the chains take one wind and descend into the pit, and are secured to a cast-iron plate suspended near the bottom, at a depth of 30 feet, on which is built a mass of masonry, forming a weight which counterbalances the whole. It is further secured by backstays at each end of the bridge, running inland under ground, and belted to blocks of hard oak. The cost is said to be very moderate.

ROYAL ITALIAN OPERA, COVENT GARDEN.—The scenery and costumes in Meyerbeer's new opera, *Le Prophète*, are worthy of the magnificent work they are intended to illustrate. Messrs. Grieve and Telbin have here done their best, and we the more gladly award them our hearty commendation, because, on a late occasion, we found it necessary to object, on the score of chronology. The first scene—a landscape with windmills—is a nice work. In the scene for the winter sports there is a wooden bridge across the stage, and a large tree in the middle distance, cleverly managed. The great scene, however, is that of the third act, the interior of the cathedral of Munster, for which a novel point of view is taken,—across the transept, looking obliquely into the choir. When the stage is filled with a crowd of splendid costumes the appearance presented by this scene has seldom been equalled.

FALL OF A STAIRCASE IN CHARLES-STREET, DRURY-LANE.—A cry of fire was raised in a large building in Charles-street, Drury-lane,—formerly a coach factory, and now a Roman Catholic chapel,—on Sunday evening last; and a crowd rushing to the staircase, this fell in with a tremendous crash, and seriously injured a number of persons. The alarm was caused, in the first instance, by the weight of the audience causing a partial subsidence of the floor.

ST. MARY'S, WEST BROMPTON.—The first stone of this church, of which we gave an engraving a short time since, was laid on the 2nd inst., by the Venerable Archdeacon Sinclair, assisted by a large body of the local clergy and the inhabitants of the neighbourhood. Robert Gunter, Esq., the donor of the land, afterwards entertained a number of the principal visiters at his residence.

BRIGHTON PAVILION.—The inhabitants of Brighton have determined on purchasing the Pavilion at the price named by the Woods and Forests, 53,000*l.*

LAMINATED TIMBER ARCHES.—Messrs. Green's handsome wooden bridges, on the line of the Newcastle and North Shields Railway, have familiarized the public eye with the laminated timber arch. The principle, as we learn from THE BUILDER, is now applied to the construction of roofs; and a controversy has arisen as to authorship or discovery. If our worthy contemporary, who gives names, dates, and extracts, in relation to laminated arch ribs, will turn to Coxe's "Travels in Switzerland," volume first, second edition, 1791, he will find mentioned, at page 132, the wooden bridge of Wettingen, which spans the Limmat, near Baden, and was erected by Ulric Grubenman, of Appenzel, a self-taught architect; and the letterpress is accompanied by an engraving from a sketch by Sir John Soane. Coxe's description is vague, but the arch is evidently formed of laminated timber.—*Gateshead Observer.*

STREET ORDERLIES.—The united parishes of St. Giles-in-the-Fields and St. George, Bloomsbury, have come to the resolution of employing "street orderlies" for the purpose of cleansing the public streets. We commend them for the step, and hope to see the example followed.

VERY BLIND.—Tenders for slight repairs and the painting of a house in Great Marlborough-street:—

| | |
|---|---|
| Beasley ..... | £290 0 |
| Battam and Crask..... | 114 0 |
| McLachlan (accepted) ..... | 97 12 |

## TO CORRESPONDENTS.

*Received.*—"G." (Canterbury), "W. B." (the Architectural Lending Library advertised in our pages is a *bona fide* undertaking. We will look to it. As to asphaltum for staining, apply to Seyssel Asphalte Company), "J. H." (the drawings shall be left at York-street), "R. T.," "R. W.," "K. N. R." (we are compelled to adhere to our regulation), "A. B." (must wait his turn), "L. L.," "T. H.," "Constant Reader," "P. R.," "W. Y.," "F. N.," "J. Q." (the MS. has arrived, but has not yet been examined), "Jacob Omnium," "Scrutator" (had better state his objections), "G. R. B. (thanks—it shall appear), "J. G., jun. (yes), "R. T.," "J. P. W." (the article in question was inadvertently omitted. Further reference is not desirable), "E. W.," "J. C. P.," "Juvenis," (*rebuilding* the buttress in the manner shown is scarcely defensible), "C. F.", "J. W." "Drainage,"—a pile of letters on this subject must stand over.

ERRATUM.—Montacute House is in *Somersetshire*, near Yeovil, and not Wiltshire as stated.

"*Books, Prices, and Addresses.*"—We have not time to point out books or find addresses.

NOTICE.—All communications respecting *advertisements* should be addressed to the "Publisher," and not to the "Editor:" all other communications should be addressed to the EDITOR, and *not* to the Publisher.


## ADVERTISEMENTS.

**ROYAL POLYTECHNIC INSTITUTION.**—An Illustration of Ancient Traditions, in Tale and Song, after the Manner of the Ancient Minstrels, by George Soane, R.A., assisted by Miss Clara Soane and Miss Rose Soane, every Evening at Eight.—Rome Illustrated in a Series of Dissolving Views.—A Descriptive Lecture, embracing the most interesting points connected with the subject, will be given by Mr. J. Russell.—Lectures on Chemistry, by Mr. J. M. Ashley. Daily at Half-past Three, and on the Evenings of Monday, Wednesday, and Friday, at Nine o'clock. Lecture, by Dr. Bachhoffner, on Masters's Patent Process of Freezing Dessert Ices, &c. Diver and Diving Bell.—Admission, 1s.: Schools, half-price.

**ROYAL MANCHESTER INSTITUTION'S EXHIBITION of PRACTICAL SCIENCE, MANUFACTURES, and the ARTS.**—This exhibition will open at the beginning of March and close at the end of May. Works intended for exhibition must arrive as follows:—Machinery and models of machinery, on or before January 31st; plate and plated goods, on or before February 21st; all other articles on or before February 14th. They must be addressed to the "Honorary Secretary," Royal Institution, Manchester, accompanied with full descriptions, and the name of the maker, inventor or designer, in addition to that of the exhibitor. All articles to be subject to the approval or rejection of the council, and to be at the owner's risk. The carriage to Manchester will be paid on works sent by invited parties, but the return carriage must be paid by the contributors. All articles must remain till the close of the exhibition, except textile manufactures, which may be removed and changed as may be agreed upon. Motive power will be found by the institution for machinery and working models, but the same must be put up and fitted by the contributors.—Blank schedules and other particulars will be furnished on application to the Honorary Secretary.

GEO. WAREING ORMROD, Hon. Sec.

**TERRA-COTTA, or VITRIFIED STONE WORKS,** King Edward-street, Westminster-road, London.—M. H. BLANCHARD, from late Coade's Original Works, Belvedere-road, Lambeth, begs to inform the Nobility, Gentry, Architects, and Builders, that he has re-established the manufacture of that invaluable material, which has been successfully adopted by our eminent Architects and others, in the adornment of our noblest buildings, nearly 100 years has proved the imperishable nature of the material, the specimens of those times now exhibiting all their primitive sharpness.

Groups, statues, friezes, capitals, panelling, pinnacles, finials, terminals, Tudor, and other chimney shafts, balustrading, fountains, fonts, tazzas, vases, coats of arms, devises, and every description of architectural ornament, at prices in many instances nearly half the cost of stone.

Specimens of the material to be seen at the Office of "The Builder," 2, York-street, Covent Garden, and at the Works.

**BIELEFELD'S PAPIER MACHE.**—The superiority of which, for Architectural Decorations, is proved by the fact of its extensive application in this and other countries. A quarto volume is published, price 1l., with a Tariff, containing upwards of 1,000 designs, most of them executed for works designed by eminent Architects. Patronised by the Hon. Commissioners of Her Majesty's Woods and Works.

"This is unquestionably a most valuable invention."—*Literary Gazette.*

Works, 15, Wellington-street North, Strand.

**PAPIER MACHE and CARTON PIERRE ENRICHMENTS MANUFACTORY,** 49 and 50, Rathbone place.—GEORGE JACKSON and SONS beg the attention of Architects, Builders, Decorators, and others, to their large assortment of ENRICHMENTS in every style, executed in the highest class of art.

The facilities and repeated enlargement of means enable GEORGE JACKSON and SONS to announce the execution of works of the above descriptions in these advantageous materials at a cost considerably below any known method, while for quality, relief, and finish, they flatter themselves they stand unrivalled.

Just published—a large Quarto Work of their ENRICHMENTS with dimensions for reference and price.

**SNOXELL'S PATENT SAFETY REVOLVING WOOD SHUTTERS,** Manufactory, 98, REGENT-STREET and 121, CHANCERY-LANE. Patent sealed on the 4th day of February, 1845, for Fourteen Years, for Improvements in Revolving Shutters of WOOD and IRON, consisting of Six Methods of Raising and Lowering Shutters, without Machinery, and Two for Hinging and Sheathing the Edges of Wood Laths with Iron.—The Patentee having fixed up some hundreds, will feel pleased in forwarding the Testimonials of Architects, Principals of large Establishments, and others, having them now in use, which fully guarantees the Patentee in stating they are beyond dispute superior to any other Revolving Shutter for durability, security, and simplicity, without the use of cog-wheel worm and screw gear, or any other complicated machinery employed by other makers.

**IRON SHUTTERS.—The PATENT CONVEX REVOLVING IRON SHUTTERS** are cheaper, twelve times stronger, work easier, cannot run down, and roll up in one-third less room than any other shutters made. Harcourt Quincey, Patentee.

CLARK and Co., Sole Manufacturers, and of IMPROVED DRAWN ORNAMENTAL METALLIC SASH BARS, ASTRAGALS, MOULDINGS, STALL-BOARD PLATES, &c. &c., in brass, copper, and zinc. WROUGHT-IRON GIRDERS, HOT-WATER APPARATUS, and metal works of every description connected with buildings. Steam engines, millwork, and machinery. CLARK and Co., Engineers, 238, Wapping. Models can be seen and every information obtained at 456, Oxford-street, and 4, Moorgate-street, City. Agent for Scotland, Mr. G. BRIGSTOCK, 17 George-street, Edinburgh.

**BUNNETT and Co., ENGINEERS,**
Patentees of
REVOLVING IRON AND WOOD SAFETY SHUTTERS,
and of
ORNAMENTAL METALLIC SASH BARS, MOULDINGS, &c., IN BRASS, COPPER, ZINC, &c.
FOR SHOP-FRONTS, SKYLIGHTS, &c.

Shop-fronts completely fitted and fixed in a superior style, either plain or ornamental, also glazed with best plate glass. Strong moulded stallboards handsomely engraved. Metal works and machinery of all kinds in connection with banking-houses, shops, warehouses, &c. &c.

B. and Co. challenge competition as to either quality or price. Designs furnished and estimates given.

IMPROVED PATENT BENCH AND FLOORING CRAMPS FOR BUILDERS.
SOLE LICENCEES FOR MARVIN and MOORE'S PATENT DIAGONAL GRATINGS.
Office of the Patentees, 28, Lombard-street, London; and at the Works, Deptford, Kent.

**MINTON and CO.'S ENCAUSTIC and** other PATENT TILES for Churches, Entrance Halls, Conservatories, Balconies, &c., Antique, Geometrical, and Alhambric Mosaics, manufactures of a highly decorative character and extreme durability. Slabs and Tiles for Fireplaces, Hearths, and Cornices for Grates, Door Furniture, White Glazed and Ornamental Tiles for Baths, Dairies, and Kitchen Ranges may be had in great variety at their Warehouse, 9, Albion-place, Blackfriars-bridge, London, and at their Manufactory, Stoke-upon-Trent, Staffordshire.

TO THE BUILDING PUBLIC.

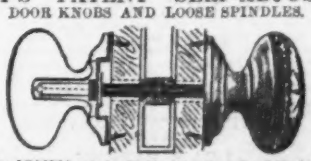
**FIRST-RATE ORNAMENTS in PORTLAND, ROMAN** and other CEMENTS, and PLASTER of PARIS, at reasonable prices, consisting of Vases, Balusters, Capitals, perforated Panellings, Cantilevers, Brackets, Trusses, Wreaths, Scrolls, Masques, Heads, Figures, Friezes, Gothic and other Chimney-Shafts, Soffits, Bed-mouldings, Paterae, &c., &c. Centre Flowers from 10 feet diameter downwards. An assortment of Shop-front Trusses always ready for fixing.—HERBERT and SON, Modellers, &c., 42, Parker-street, Drury-lane.

**THE SECURITY from FIRE which** results from the adoption of the system of constructing FLOORS, CEILINGS, and ROOFS, invented and patented by Dr. FOX, is attained WITHOUT any INCREASE of COST. In this system the ordinary timber joists are superseded, and light iron ones (in which the requisite degree of strength is developed by combination) are substituted; these, together with successive layers of incombustible materials, forming a perfectly fire-proof foundation, capable of receiving a finished surface of wood, composition, stone, slate, or tile, &c. This plan of building possesses much greater durability than the ordinary method; the structure is effectually protected from the attacks of Dry-rot; and the annoyance resulting from vermin and insects of all kinds is entirely prevented.

The advantage of this system, whether in Dwelling-houses, Warehouses, Manufactories, or other buildings, is attended with economy—immediate, in the reduction of the first cost; and prospective, in the absence of charge for repairs. Every advantage attained by the ordinary methods of fire-proof building is effectually secured at about one-half the cost, while the lateral thrust, so objectionable in the iron girder and brick arch system, is entirely avoided. The great superiority of this plan has been proved by many years of trial, and every information may be obtained on application to Messrs. FOX and BARRETT, Leicester Chambers, 46, Leicester-square.

By Her Majesty's Royal Letters Patent.

**PITT'S PATENT SELF-ADJUSTING DOOR KNOBS AND LOOSE SPINDLES.**



HART and SONS beg to invite the attention of architects, builders, and others, to their Door Furniture, mounted for PITT'S PATENTED SPINDLES. The knobs are stronger, more durable, and more elegant in form, than those in ordinary use, as the spindles, being loose, do not require the objectionable side screw. They are more readily fixed, are suitable for every description of lock now in use, and, as they adjust themselves to doors of different thicknesses, without alteration, are particularly adapted for the country or for exportation.

In addition to an extensive stock of door furniture in china, crystal, amber, and opal glass, buffalo horn, ivory, ebony, brass, &c., en suite, with finger-plates, bell-pulls, and levers, new patterns of original design are constantly being added, and an order either to sketch or pattern supplied very promptly. A simple one, for example, in three days, and a more elaborate one in less than a week.—May be obtained through any ironmonger, or direct from the proprietors and sole manufacturers, HART and SONS, Wholesale Ironmongers, 83, 84, 85, Wych-street, Strand, London.
A list of prices sent on application.

**REDUCED PRICES.—EDWARD SIMMS** (late William Cleave), of Wilton-road, Pimlico Basin, begs to acquaint Builders and the Trade that he has now on hand, at his Manufactory (the first of its kind ever established), a very large Assortment of Dry and Well-seasoned OAK and DEAL PREPARED FLOORING BOARDS and MATCH BOARDING of all sorts, from ¾ inch to 1¼ inch thick, planed to a parallel width and thickness, and at greatly Reduced Prices. Also, Timber, Deals, Oak Planks, Scantlings, Sash Stiles, Mouldings prepared by Machinery, Laths, &c.—Apply at E. SIMMS'S (late W. Cleave's) Flooring Manufactory, Wilton-road, Pimlico Basin.

**A REDUCTION in the PRICE of FLOOR BOARDS.**—ALFRED ROSLING begs to inform the Trade and Consumers generally, that he has REDUCED the PRICE, and keeps constantly in stock a large and very general assortment of Prepared Floor Boards and Matched Boarding, planed to a parallel breadth and thickness, and fit for immediate use; also a variety of machine-prepared Mouldings, which are finished with great accuracy and attention to quality of workmanship.—Southwark Bridge Wharf, Bankside, and Old Barge Wharf, Upper Ground-street, Blackfriars.

**GREAT REDUCTION IN THE PRICE OF FLOOR BOARDS AND MATCH BOARDING.**—THOMAS ADAMS (late S. Dare), Mahogany and Timber Merchant, Bermondsey New-road, Southwark, near the Bricklayers' Arms, begs to inform his friends and the trade generally, that he has in stock a large assortment of the above goods, fit for immediate use, at prices which only require a trial to prove their decided cheapness. Also mouldings prepared by machinery from the very best material, and in a superior manner; cut deals and scantling of every dimension; mahogany, cedar, rosewood, wainscot, elm, beech, oak, &c., in planks, boards, veneers, and logs; pantile, oak, and fir laths; wheelwrights' goods. All sawn and prepared goods (except timber) delivered free of expense; sawing charged at mill prices. Very extensive drying sheds.

**JOHN ANGOLD** begs to invite the attention of Builders and others to his dry and well-selected stock (in various thicknesses) of WAINSCOT, MAHOGANY, and almost every other description of foreign and English wood, which he has determined to offer at a considerable reduction from the usual prices.—73, Mortimer-street, and 23, Tottenham-street, Tottenham-court-road.

MUIR'S PATENT

PLANING MACHINE.

SAW MILLS, GILLINGHAM-STREET, PIMLICO.

**TIMBER of any size, PLANK, DEALS, and BATTENS,** &c., Sawn on the most approved principle, Boards, &c., Prepared, Matched, and Grooved, by Muir's Patent Machinery. The Mills have all the advantages of navigation and water-carriage, being connected with the Thames by the Grosvenor Canal. Goods fetched from the docks and carted home free of charge.

Address to HENRY SOUTHAM,
Saw Mills, Gillingham-street, Pimlico.
N.B. Estimates given for Sawing and Planing.

**GENERAL WOOD-CUTTING COMPANY.**—SAWING, PLANING, AND MOULDING MILLS, Belvedere-road, Lambeth, between the Suspension and Waterloo Bridges. SAWING and PLANING in all their branches executed with the greatest despatch and punctuality. A large Stock of seasoned and beautifully WORKED MOULDINGS, consisting of upwards of 100 different patterns kept constantly on hand; also an extensive assortment of dry prepared FLOORING BOARDS, of all qualities and at reasonable rates.

**PHILLIPS, ALLCARD, and CO.'S IMPERIAL DEAL SAW-MILLS,** WENLOCK-ROAD CITY-ROAD, beg to invite the attention of builders, carpenters and the trade, to their well selected stock, consisting of a large assortment of TIMBER, DEALS, PLANKS, and BATTENS, of every description, and thoroughly seasoned. They also have constantly on hand, and ready for immediate use, white and yellow prepared FLOORING BOARDS of all thicknesses, and matched lining, cut and planed to a parallel breadth and thickness. And they are enabled to offer all their goods at very moderate prices.

**DESICCATED WOOD.—DAVISON and SYMINGTON'S PATENT.**—Builders, Cabinet-makers, and others, will find it much to their advantage to patronise this new process of seasoning. The greenest wood can thus not only be seasoned in an incredibly short space of time, at a small cost, but is rendered stronger, entirely free from shrinkage, and in every respect better than wood treated in the ordinary way; thereby saving capital, interest of money, insurance, and all the other inconveniences attending the keeping of a large stock.

The DESICCATING SAWING and PLANING MILLS are situated at PLOUGH BRIDGE, ROTHERHITHE, adjoining the Commercial and East Country Docks, from whence parties obtaining their material can have the same converted as required, and sent home fit for immediate use.—T. GIRLING, Manager.

For licences to use the patent, scale of prices, or other information, address, ANGUS JENNINGS, Secretary, Patent Desiccating Company, 41, Gracechurch-street, City.

TO ARCHITECTS, BUILDERS, UPHOLSTERERS, AND OTHERS.

**WOOD CARVING done in the cheapest** and best manner. Estimates given to any amount. Pulpits, reading-desks, altar-rails, stalls, and other church fittings supplied complete. Old carvings restored by J. STALON, Wood Carver and Manufacturer, 42, Berwick-street, Soho, London.

**JORDAN'S PATENT MACHINE CARVING and MOULDING WORKS for WOOD and STONE,** Belvedere-road, Lambeth, and 154, Strand.—TAYLOR, WILLIAMS, and JORDAN beg to call the attention of the building community to a new feature of their establishment, and, at the same time, to thank their numerous patrons and friends for the very liberal support they have lately experienced, which, they assure them and the public, it will be their constant endeavour to deserve, by giving their customers an increasing share of the advantages arising from the constant improvements in the machinery which they have just succeeded in applying to the production of the most intricate carving in Caen and other freestones, and in statuary marble.

T., W., and J. particularly solicit the attention of architects and builders to the fact that, by the use of this machinery, a very large saving, both of time and money, is effected,—so great, indeed, that in many cases they can deliver a well-finished article in Caen stone for less money than it can be obtained in cement, while their wood-carving will, in some cases, be found to come into close competition with the best kinds of composition ornament.—For prices and estimates apply at 154, Strand.

TESTIMONIAL FROM CHARLES BARRY, ESQ.
"Westminster, May 16th, 1843.

"Gentlemen,—In reply to your letter requesting my opinion of your Patent Carving Machinery, I have much pleasure in stating, from an experience of more than two years, in its application to the production of the wood carvings of the House of Peers, and other apartments of the New Palace, at Westminster, that I am enabled to make the most favourable report concerning it, and to add that it has more than justified the favourable terms in which I recommended it in 1845 to her Majesty's Commissioners of Woods and Works for adoption.—I remain, Gentlemen, yours faithfully,
"CHARLES BARRY.

*Messrs. Taylor, Williams, and Jordan.*"

**SAMUEL HOOD and Co., Castings Warehouse,** 81, Upper Thames-street. REGISTERED STABLE FITTINGS. Enamelled Mangers, with double hay-racks, or with panelled water-cistern on one side.

# PIERCE'S NEWLY-INVENTED
## PATENT PYRO-PNEUMATIC PURE WARM AIR SELF-ACTING AND VENTILATING STOVE-GRATE,
SPECIALLY ADAPTED FOR
CHURCHES, CHAPELS, INFANT AND OTHER SCHOOLS, PUBLIC BUILDINGS OR PRIVATE DWELLINGS, BANKING HOUSES, RAILWAY OFFICES PICTURE GALLERIES, ENTRANCE HALLS, LECTURE ROOMS, INVALIDS' APARTMENTS, &c. &c.

PIERCE solicits an examination of his newly-invented method of WARMING AND VENTILATING, by means of his Patent Pyro-Pneumatic Stove Grate, which, from the NOVELTY of its principle, SIMPLICITY of its arrangement, and ELEGANCE of design, combined with its great ECONOMY IN USE, renders this grate suitable for any situation where a POWERFUL DEGREE OF WARMTH, and the CHEERFUL OPEN FIRE are desirable.—PIERCE having at length succeeded in producing that long-sought desideratum—a HEALTHFUL AND SALUBRIOUS atmosphere, such as is felt on a pleasant summer's day, which can, by means of this his Patent Pyro-Pneumatic Stove Grate, be enjoyed during the most dull and dreary of our winter months. The above invention is specially adapted for warming churches, infant and other schools, railway offices, entrance halls, banking houses, &c. &c., or any situation where warmth and purity of air are desirable.—IT MAY BE SEEN IN DAILY USE AT THE PATENTEE'S MANUFACTORY, 5, JERMYN-STREET, REGENT-STREET; also warming the large MODEL ROOM at the Exposition of British Manufactures, now exhibiting at the SOCIETY OF ARTS, John-street, Adelphi (who have awarded their Honorary Medal to the inventor).

FOR DETAILED PARTICULARS AND OPINIONS OF THE PUBLIC PRESS, SEE "THE BUILDER," FEB. 17, MARCH 3, AND 31.

**GREAVES'S BLUE LIAS LIME, LIAS** CEMENT, and IMPROVED LIAS CEMENT, at RUTTY and VERRY, 8, South Wharf, Paddington; and W. and T. U. GLADDISH, Pedlar's-acre, Lambeth. The present low rates of transit enable the proprietor to send to any part of the kingdom at very moderate prices, from his works, Southam, Warwickshire.

**ROMAN CEMENT, made according to** the specification of Parker's Patent, may be had genuine of J. M. BLASHFIELD (late Wyatt, Parker, and Co.), Waterloo Dock Wharf, Commercial-road, Lambeth, No. 1, Irongate Wharf, Paddington, and at the Manufactory, Mill Wall, Poplar. Also Plaster, Mastic, Tarras, Bricks, Tiles, &c.

VEINED AND SICILIAN MARBLE
in Scantlings and Slabs of the first quality, just imported.

**PARIAN CEMENT, for internal stucco,** instead of common plastering, may be painted and papered within twenty hours of its application to the bare walls, and by the use of which, rooms may be rendered habitable before the materials commonly adopted would begin to dry. It is worked without the slightest difficulty, the labour being easier and less expensive than with any other stucco whatever. A finer quality is also prepared for ornamental plastering, for encaustic painting, &c. &c.—Specimens of which may be seen at the works of the Patentees, CHAS. FRANCIS and SONS, Nine Elms, London.

**KEENE'S and PARIAN CEMENTS,** for internal stucco, are employed very advantageously in place of wood for skirtings, architraves, and panel mouldings, and for in-door flooring, instead of stone. The peculiar properties of PARIAN Cement allow of its being painted or papered upon within a few hours of its application, and thus render it an important substitute for common plastering in those cases where expedition and beauty of finish are essential.—J. B. WHITE and SONS, Millbank-street, Westminster, Patentees of KEENE'S Cement, Licensees of PARIAN Cement.

**PORTLAND CEMENT, as manufactured** by J. B. WHITE and SONS, possesses all the properties of the best Roman Cement, but has the advantage over that material of wholly resisting frost; and when used as a stucco it does not vegetate or turn green in damp situations, and requires no colouring. Employed as an hydraulic mortar for brickwork, it carries four to five measures of sand to one of cement, and is proved by trial to become harder and stronger in these proportions than Roman Cement with but one measure of sand. This superior connecting power, combined with its eminently hydraulic properties, point it out as the fittest material for building sea and embankment walls, the lining of reservoirs, cisterns, and baths, and for all those purposes where strength and a perfect resistance to water are required.

Manufacturers—J. B. WHITE and SON, Millbank-street, Westminster, and 26, Seel-street, Liverpool.

**PORTLAND CEMENT, solely** MANUFACTURED by WILLIAM ASPDIN, Son of the Patentee.—Messrs. ROBINS, ASPDIN, and Co. request reference to No. 256, page 491; and also Nos. 284 and 285, pages 543 and 551 of "The Builder," for accounts of EXPERIMENTS on the strength of Portland Cements, whereby the great superiority of their Cement is manifest. This Cement has been proved for upwards of twenty years in the Thames Tunnel to resist the action of water; it is stronger in its cementitious qualities, harder, and more durable than any other description of Cement; it does not vegetate, oxydate, or turn green; nor is it affected by any atmospheric influence whatever the climate, resisting alike the action of frost and heat. It is manufactured to set in from five to sixty minutes. For all purposes that Cement is applicable the Proprietors challenge competition.—Orders received by Messrs. ROBINS, ASPDIN, and Company, at their Manufactory, Northfleet, Kent, and their Wharf, Great Scotland-yard, Whitehall; also by their Agent at the Depôt, 1, Back Goree, Liverpool.

**MARTIN'S PATENT FIRE-PROOF and** ORNAMENTAL CEMENT—REDUCTION of PRICE.—The Patentees beg to inform their Friends and the Public that they have made arrangements which enable them to offer this invaluable cement at a considerably reduced price. It has now been before the public so many years, and has obtained so high a standing in the estimation of all who have used it, that it is unnecessary to comment on its merits. The Patentees, however, feel called upon to observe, that by its use—from the greater amount of surface which a given quantity will cover, and the small amount of labour required in working it, a saving of 25 to 30 per cent. is effected as compared with other cements for internal use. Specimens shewing its beauty, hardness, and applicability to all plain and ornamental purposes, may be seen; and the Cement in any quantity obtained of the Patentees, Messrs. STEVENS and SON, at their Plaster and Cement Works, 186, Drury-lane, London.—Agent for Liverpool.

Mr. GEORGE NEWTON, No. 6, Lawton-street, Bold-street.

**JOHN'S and Co. PATENT STUCCO** CEMENT and PAINT.—GREAT REDUCTION of PRICE.—The Patentees beg to inform the trade and the public generally, that in order to induce a more extended adoption of these excellent materials, and to bring them into direct competition with the inferior articles in common use, they have determined to reduce the price nearly 25 per cent., confidently trusting to a mutually advantageous result. These materials, for their beauty, durability, imperviousness, perfect resistance to frost or heat, and great cheapness, fully justify the confidence reposed in them, as shown by numerous testimonials. For INTERIOR or EXTERIOR SURFACES this cement possesses the following remarkable properties: having no caustic qualities, it may be painted on or papered within a few days after its application, and a new house may thus be rendered habitable without any delay. It never blisters, cracks, or vegetates; very soon becomes as hard as stone, and may be cleaned with a brush and water.—Prospectuses, specimens, and every information connected with its use, price, &c., may be obtained from the sole agent, PHILIP HARE, at the Warehouse, 23, Steel-yard, Upper Thames-street.

TO PLASTERERS, BUILDERS, &c.

**JOHN'S and Co. PATENT PERMANENT** STUCCO WASH.—The attention of the trade is requested to this permanent wash, which cannot be equalled in its properties of beauty and durability for exterior stucco or brick, and being a non-absorbent, is admirably adapted for interior surfaces, for railway stations, union workhouses, schools, asylums, barracks, stables, prisons, &c. It will not wash off, may be tinted to any colour, and 1 cwt. will cover 300 yards.—Price 10s. per cwt. Sole agent, PHILIP HARE, 23, Steel-yard, Upper Thames-street.

**EMERSON'S PATENT LIQUID** CEMENT is ready for use, is simple in its application, and only ONE-EIGHTH the cost of oil paint; for beauty it is pre-eminent over all other materials used on the fronts of houses, giving the exact appearance of FINE CUT STONE; can be used at once on fresh Roman cement or other plastering; is particularly calculated for country houses, villas, or gate entrances that have become soiled or dingy, which can be beautified in any weather, at a trifling cost.—Sold in casks of 1, 2, and 3 cwt., at 8s., 15s. and 22s. each.

PATENT MINERAL PAINT.

Invaluable as a coating for SHIPS' SIDES AND BOTTOMS all kinds of WOOD or METAL work, roofing felts, leaky roofs, spouts and gutters, doors, sheds, railing, and all kinds of out-door work, and being perfectly waterproof, will preserve their surfaces from atmospheric influence and decay,—requires no preparation, and will dry in a few hours.—Sold in casks, 2 to 30 gallons. Brilliant Black, 2s.; Rich Brown, 2s. 9d. per gallon.

BELL, LEAR, and Co, No. 16, Basing-lane, Cheapside.

**GRAY STONE and WHITE FLAME** LIME WORKS, BEWLAY CLIFF, on the Medway, KENT.—GEORGE POTTER and CO., having added the old and well-known business at the Purfleet Wharfs, Earl-street, Blackfriars, and Camden-town, to their former town establishments, are ready to supply Contractors, Builders, Gas Companies, and the Trade generally, with Gray Stone, White Flame, and Chalk Limes, upon the usual terms. Annexed is a list of their wharfs:—

City—Purfleet Wharf, Earl-street, Blackfriars.
Pimlico—Grosvenor Basin.
Chelsea—Druce's Wharf.
Paddington—No. 13, North Wharf (adjoining Great Wester Termini).
Camden-town—James-street.
City-road Basin—Wharf-road.

**PLASTER OF PARIS.—Messrs. Thomas** Frean and Co. having recently established Plaster of Paris Works on the most approved principles are at all times ready to execute the orders of builders and others with this article, of very superior quality and at moderate rates.—Roman Cement Works and Lime Wharf, Regent's Canal, Kingsland-road.

**TODD'S PATENT PROTOXIDE** PAINT, at a very considerable REDUCTION of PRICE.—This article is extensively used by the principal Railway and Gas Companies, and by Builders and others for painting Stucco. It prevents iron from rusting, wood from decay, masonry from damp, and the hottest sun has no effect upon it.—Manufactured by CHARLES FRANCIS and SONS, Cement Works, Nine Elms London

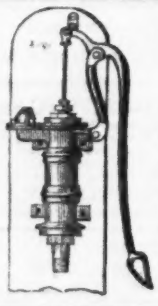
BUILDERS AND CONTRACTORS.

**TARPAULINS for COVERING ROOFS** during Repairs. SCAFFOLD CORD and every description of ROPE used by Builders upon the lowest terms. Marquees and temporary awnings on sale or hire. Orders per post receive the most prompt attention.—WILLIAM PIGGOTT, 115, Fore Street, City, Manufacturer, by Appointment, to Her Majesty's Honourable Board of Ordnance.

TO ARCHITECTS, BUILDERS, AND BRICK-MAKERS.

**PUMPS of Superior CONSTRUCTION,** bored perfectly true by improved machinery, in various plain and ornamental patterns for Conservatories, Squares, Market Places, Roads, Gardens, and for Liquid Manure. BRICK-MAKERS' PUMPS, in Wrought and Cast Iron, HYDRAULIC LIFT PUMPS, and ENGINES for Wells of any depth. SINGLE and DOUBLE PUMPS up to twelve-inch bore, kept for Hire.

BENJ. FOWLER (late of 63, Dorset-street), removed to the new Factory, Whitefriars-street, Fleet-street.



TO BUILDERS AND PLUMBERS

**THE attention of the** Trade is called to

JOHN WARNER & SONS' PATENT VIBRATING STANDARD PUMP,

which is recommended for the simplicity of its construction, and the case with which it works.

By the introduction of the vibrating standard the cumbrous carriage and expensive slings and guides are unnecessary, rendering the price considerably less than pumps made on the old plan.

Beer and Water Engines for raising fluids from a depth not exceeding 28 feet; also, Garden Engines constructed on the same principle.

JOHN WARNER & SONS,
8, Crescent, Jewin-street, London,
Manufacturers and Patentees.

**TO PUMP, GARDEN, and BEER-** ENGINE MAKERS.—LICENSES for the manufacture of JOHN WARNER and SONS' Patent Vibrating Standard Pumps and Engines may be obtained at their Manufactory, No. 8, Crescent, Jewin-street, London.

**FLEXIBLE INDIA-RUBBER PIPES** AND TUBING, For Railway Companies, Brewers, Distillers, Fire Engines, Gas Companies, Gardening and Agricultural purposes, &c.—J. L. HANCOCK'S patent VULCANIZED INDIA-RUBBER HOSE-PIPES are made to stand hot liquor, and acids without injury—do not become hard or stiff in any temperature (but are always perfectly flexible) and as they require no application of oil or dressing, are particularly well adapted for Fire Engines, Pumps, Gas, Beer Engines, Gardens, Liquid Manure, and all purposes where a perfectly flexible pipe is required. Made all sizes, from ¼ inch bore upwards, and of any length to order. Vulcanized India rubber garden hose fitted with brass taps, copper branch and roses complete, ready to be attached to pumps, water-butts, or cisterns. Sole manufacturer, JAMES LYNE HANCOCK, Goswell-mews, Goswell-road, London.

JAS. LYNE HANCOCK invites the attention of parties using one lengths of FLEXIBLE GARDEN HOSE to his SELF-ACTING HOSE-PIPE REEL, which will be found a most convenient machine for readily winding up and conveying away the hose when out of use. By it also liquid manure is easily distributed from tanks.

N.B. Vulcanized India-rubber washers of all sizes for joints or hot-water and steam pipes, and vulcanized sheet rubber any thickness for all kinds of joints, and other purposes.

**GIBBONS, SON, and Co., respectfully** inform the Public they are Sole Agents for TANN'S PATENT RELIANCE DETECTOR LOCKS, noticed in "The Builder," of July 7th. The additional security over all other Locks is the introduction of a Guard on one of the levers, so that false keys or picks cannot open them.—Supplied, wholesale or retail, at 345, Oxford-street, and 3, Redcross-street, London.

TO BUILDERS, CABINET-MAKERS, AND OTHERS.

LEA'S PATENT

MORTISE LOCKS and BOLTS

are a great improvement over the present mode of fastening all doors, internal and external; they are also much better and cheaper than the espagniolette fastening for French and other casements;

THE USE OF FLUSH BOLTS IS ENTIRELY SUPERSEDED,

and both doors are ingeniously and effectively rendered secure.

Prices, and every information, given at the Agents, A. L. PFEIL and Co., Wholesale Ironmongers, 5 and 6, Broad-street, Bloomsbury.

CHUBBS' LOCKS, FIRE-PROOF SAFES, AND CASH BOXES.

**CHUBBS' PATENT DETECTOR** LOCKS give perfect security from false keys, and picklocks, and also detect any attempt to open them. They are made of all sizes, and for every purpose to which locks are applied, and are strong, secure, simple, and durable.

CHUBBS' PATENT LATCH, for front doors, counting-house doors, &c., is simple in construction, low in price, and quite secure. The keys are particularly neat and portable.

CHUBBS' PATENT FIRE-PROOF SAFES, BOOKCASES, CHESTS, &c., made entirely of strong wrought-iron, so as effectually to resist the falling of brick-work, timber, &c., in case of fire, and are also perfectly secure from the attacks of the most skilful burglars.

CHUBBS' CASH and DEED BOXES, fitted with the Detector Locks.

CHUBB and SON, 57, St. Paul's Churchyard, London.

**IRON FOUNDRY, 80, Goswell-street (late of** Brick-lane, St. Luke's).—J. J. JONES having made great additions to his STOCK of PATTERNS, begs to inform the Trade, that he can now supply them with Plain and Ornamental Iron Columns Girders, Railings, Gates, Iron Coping, Balconies, Window Guards, Verandahs, Ornamental Staircase Panels, Iron Staircases, Tomb Enclosures, Trellis Panelling, Lamp and other Brackets, Cantilevers, Newel Bars, Water Closet Work, Area Gratings, Fly and other Wheels, Wheel Plates, &c.

BAKER'S OVEN WORK, Forge Backs and Troughs, Rain Water Pipes and Gutters, Sash Weights, Furnace Bars, Stoves Ranges, &c., always in stock.

**IRON FOUNDRY,**
68, DRURY-LANE, and CHARLES-STREET, DRURY-LANE
**JOSEPH GLOVER,**

Solicits the attention of the Trade to his extensive Stock of PATTERNS for CASTINGS of EVERY DESCRIPTION, consisting of those for every purpose, either structural or ornamental.

Wheel Pinion and Steam-Engine Patterns; Range Stove and Hot Plate Metal.

A stock of Rain-Water Pipes, Plain and O G Guttering, Air Bricks, Sash Weights, &c. &c.

A very superior description of Soot Door, particularly suitable for internal work, being perfectly secure, and not unsightly.

ESTIMATES given for IRON ROOFING and every description of Ironwork, complete to specification, and the work executed with every attention to quality and dispatch.

GLOVER'S FOUNDRY,
168, DRURY-LANE, and CHARLES-STREET.

**HOT-WATER APPARATUS.—The** attention of architects, builders, and others is respectfully requested to BENJAMIN FOWLER'S superior method of heating churches and chapels, halls, staircases, conservatories, forcing and greenhouses, manufactories and warehouses, kilns, rooms for drying timber, &c., and every variety of purpose for which artificial heat is required. Within the last twenty years some hundreds of buildings have been heated upon this plan, and the parties for whom they were executed are constantly expressing their satisfaction, also their willingness to vouch for their efficiency.

BENJAMIN FOWLER, late of 63, Dorset-street, removed to the new factory, Whitefriars-street, Fleet-street.

**ROBERT FULKES' STOVE and RANGE** MANUFACTORY, 91 and 92, Park-street, Camden-town.

A splendid assortment of Register Stoves on show, commencing in price at 6d. per inch. Elliptic ditto, with double backs, 2½d. per inch. Ranges of all kinds equally low. Best rain-water pipe, 2½ inches, 1s.; 3 inches, 1s. 3d. per yard. Cast Lath Nails, 10s. 3d. per cwt. 6-inch rim Locks, with brass striker, staples, and patent spindles, 15s. per dozen. Every description of Ironmongery at the lowest prices.

CHEAP

**IRONMONGERY WAREHOUSE,**
2, York-street, Borough, leading to the Borough Market—GEORGE SANDEMAN and Co.

Elliptic stoves, with double backs, 3d. per inch.
Register stoves..... 6½d. per inch.
Patent cut clasp 4d. 6d. 10d.
Per thousand.... 6d. 8d. 1s. 3d.
Best sash line, 5s. per gross.

Best Patent Sash Line.

| No. | 1 | 2 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Per gross— | 4s. 3d. | 5s. | 6s. 6d. | 7s. 6d. | 10s. 12s. |

Sash weights, 6s. per cwt.
Cast butts, 1½ 2 2½ inch.
Per dozen, 8d. 11d. 1s. 4d.
Every description of Ironmongery at the lowest prices.
Warehouse closes at Seven o'Clock.

**TO BUILDERS and CARPENTERS.—** Elliptic Stoves, double backs, 3d. per inch. Registers, 6½d 7d., 8d. per inch.

Cottage Ranges, with Ovens and Boilers, 3 ft. 2 in. 40s.; 3 ft. 4 in. 42s.; 3 ft. 6 in., 44s.

Self-acting Ranges, with Circular Oven and Back Boiler, best Wrought Bars and Bright Fittings,
2 ft., £2. 12s. 3 ft. 6, £3. 7s. 4 ft., £3. 15s.

Best Patent Cut Clasp.

| 4½d. | 5d. | 7d. | 10d. | 1s. 3d. | 1s. 8d. per 1,000 |
|---|---|---|---|---|---|
| 3d. | 4d. | 6d. | 8d. | 10d. | 20d. |

Best Sheet Floor Brads, 12s. 6d. per cwt.
Best Town Glue 32s. Do. Scotch, 52s. per cwt.

Best Patent Sash Line.

| 4s. 9d. | 5s. | 6s. 6d. | 7s. 6d. | 10s. | 12s. per gross. |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |

At F. R. WILLIAMSON'S IRONMONGERY and STOVE WAREHOUSE, 35, Chiswell-street, Finsbury-square.

Lists of Prices had on application at the Warehouse, or by letter pre-paid, inclosing postage stamp.—Warehouse closes at 7 o'clock.

TO ARCHITECTS, BUILDERS, &c.

**HAYWARD, BROTHERS,** late R. HENLY and Co., WHOLESALE IRONMONGERS, and Manufacturers of KITCHEN-RANGES, STOVES, &c., 190, Blackfriars-road, and 117, Union-street, Borough.

Strong Self-acting Kitchen Ranges, with Back Boiler and Oven and Wrought Bars:—

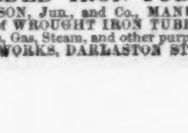
| 3 ft. | 3 ft. 3 in. | 3 ft. 6 in. | 3 ft. 9 in. | 4 ft. |
|---|---|---|---|---|
| £3. | £3. 10s. | £3. 15s. | £4. | £4. 10s. |

Henly's Patent Improved, with back Boiler and Wrought Iron Oven:—3 ft. 3 in. 3 ft. 6 in. 3 ft. 9 in. 4 ft.
£5. £5. 15s. £6. 5s. £6. 10s. £7.

Best Register Stoves, at 7d., 8d., and 9d. per inch.
Do. Elliptic do., at 3½d., and 4d. 6s.

Manufacturer of WOLFASTON'S PATENT REGISTER STOVES, a certain cure for SMOKY CHIMNEYS, and effecting a great saving in fuel. To be seen in use daily.

Orders from the Country, accompanied with a remittance or reference, will meet with prompt attention.



**LAP WELDED IRON TUBES.—W. H.** RICHARDSON, Jun., and Co., MANUFACTURERS of every description of WROUGHT IRON TUBES for Locomotive and Marine Boilers, Gas, Steam, and other purposes.
PATENT TUBE WORKS, DARLASTON STAFFORDSHIRE.